

68-FM-86



NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MSC INTERNAL NOTE NO. 68-FM-86

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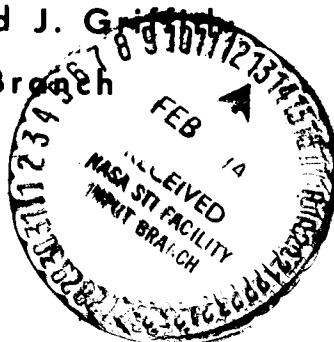
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RADAR DATA FOR CHOOSING PASSES
TO SATISFY THE MISSION C
(AS-205/CSM-101) RENDEZVOUS RADAR
TEST OBJECTIVE

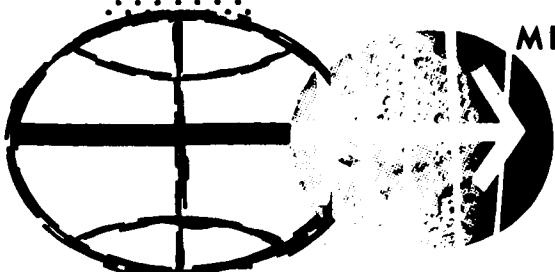
By Samuel L. Miller and David J. Griggs

Orbital Mission Analysis Branch



MISSION PLANNING AND ANALYSIS DIVISION

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS



(NASA-TM-X-69702) RADAR DATA FOR
CHOOSING PASSES TO SATISFY THE MISSION
C. (AS-205/CSM-101) RENDEZVOUS RADAR TEST
OBJECTIVE (NASA) 173 p

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MSC INTERNAL NOTE NO. 68-FM-86

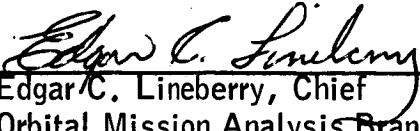
PROJECT APOLLO

RADAR DATA FOR CHOOSING PASSES TO
SATISFY THE MISSION C (AS-205/CSM-101)
RENDEZVOUS RADAR TEST OBJECTIVE

By Samuel L. Miller and David J. Griffith
Orbital Mission Analysis Branch

April 10, 1968

MISSION PLANNING AND ANALYSIS DIVISION
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

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(gg)	Revolution 91	142
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RADAR DATA FOR CHOOSING PASSES TO SATISFY THE
MISSION C (AS-205/CSM-101) RENDEZVOUS RADAR TEST OBJECTIVE
By Samuel L. Miller and David J. Griffith

SUMMARY AND INTRODUCTION

One of the test objectives of Mission C is to simulate the CSM passing over the LM while the LM is on the lunar surface. The purpose of this objective (P6.8, ref. 1) is to determine if the rendezvous radar (RR) transponder transmission from the CSM and the reception link in the LM will operate in a manner consistent with the requirements of a mode II operation during a lunar stay phase. This objective must be accomplished prior to the first lunar landing mission.

This document presents the tracking data required by the Instrumentation and Electronic Systems Division for choosing the CSM passes over the White Sands Missile Range (WSMR) tracking site during which this test objective may be satisfied. The WSMR tracking station will have the LM RR reception link.

DISCUSSION OF DATA

The Mission C reference trajectory (ref. 2) was used as a basis for generating acquisition data for the White Sands, Houston, and Cape Kennedy stations. (The Houston and Cape Kennedy stations might be able to satisfy the objective if WSMR cannot.)

The LM RR transponder system is required to meet the following performance specifications (ref. 1):

Maximum range, n. mi.	400
Maximum range rate, fps.	+4900
Maximum angular rate, deg/sec.	±1
Maximum acceleration, ft/sec ² .	50
Acquisition time, sec.	12

Range, range rate, range acceleration, and slow rate were generated for those passes over each of the above stations. These parameters are plotted as a function of dwell time over these stations with time zero being the time of closest approach.

Table I presents the acquisition of signal and loss of signal for the WSMR, Houston, and Cape Kennedy stations. Figure 1 presents acquisition data for the WSMR station, and figures 2 and 3 present acquisition data for Houston and Cape Kennedy, respectively.

Note that when the plotted parameters become constant the station has lost contact.

TABLE I. RADAR ACQUISITION AND LOSS SUMMARY

(a) White Sands		(a) White Sands - Concluded		
Revolution number	Acquisition of signal, day:hr:min:sec	Loss of signal, day:hr:min:sec	Revolution number	Acquisition of signal, day:hr:min:sec
1	0:01:32:16.630	0:01:37:31.630	147	9:19:57:38.703
2	0:03:06:43.010	0:03:12:18.010	148	9:20:31:58.703
3	0:04:41:20.010	0:04:46:55.010	149	9:22:07:10.266
4	0:06:16:20.010	0:06:20:45.010	150	9:23:42:00.266
15	0:23:53:25.010	0:23:56:35.010	151	9:23:46:25.266
16	1:01:26:40.010	1:01:32:00.010	162	10:01:17:45.296
17	1:03:00:40.519	1:03:06:05.519		10:19:01:00.906
18	1:04:36:56.718	1:04:41:35.718		
19	1:06:11:26.854	1:06:14:21.854		
30	1:23:45:46.854	1:23:50:06.854		
31	2:01:19:26.854	2:01:24:56.854	1	0:01:37:45.009
32	2:02:53:51.854	2:02:59:26.854	2	0:03:11:28.010
33	2:04:28:31.854	2:04:33:21.845	3	0:04:47:15.010
45	2:23:37:21.854	2:23:42:16.854	14	0:22:22:45.010
46	3:01:11:16.852	3:01:16:51.852	15	0:23:57:25.010
47	3:02:45:41.852	3:02:51:11.852	16	1:01:37:45.010
48	3:04:20:26.852	3:04:25:01.852	17	1:03:06:25.519
59	3:21:55:56.852	3:21:57:51.852	18	1:04:44:50.718
60	3:23:28:16.852	3:23:34:41.852	28	1:20:44:06.854
61	4:01:02:31.824	4:01:08:06.824	29	1:22:15:56.854
62	4:02:42:21.824	4:02:49:21.824	30	1:22:50:31.854
63	4:04:15:41.824	4:04:15:41.824	31	2:01:25:21.854
74	4:21:49:36.824	4:23:24:26.824	32	2:05:57:46.854
75	4:22:18:46.824	4:23:24:26.824	33	2:04:55:16.854
76	5:00:51:06.824	5:00:58:46.824	43	2:20:34:31.854
77	5:02:28:54.434	5:02:34:09.434	44	2:20:42:31.854
78	5:04:05:54.434	5:04:07:44.434	45	2:23:42:31.854
89	5:21:58:14.434	5:23:33:49.434	46	3:01:17:06.852
90	5:22:27:49.434	5:23:33:49.434	47	3:05:51:36.852
91	6:01:03:39.434	6:01:09:14.434	58	3:20:30:11.852
92	6:02:39:34.430	6:02:44:09.430	59	3:21:59:06.852
103	6:20:27:29.430	6:20:53:21.9.430	60	3:23:23:51.324
104	6:22:02:09.430	6:22:08:24.430	61	4:01:08:21.824
105	6:23:37:49.430	6:23:43:49.430	62	4:01:13:21.824
106	7:01:13:39.430	7:01:19:09.430	63	4:02:43:01.824
107	7:04:49:57.480	7:05:23:22.680	73	4:20:15:36.824
118	7:20:31:32.680	7:20:31:32.680	74	4:21:49:51.824
119	7:22:06:22.680	7:22:10:52.680	75	4:23:24:36.824
120	7:23:41:22.680	7:23:45:47.680	76	5:00:59:04.414
121	8:01:16:17.680	8:01:20:32.680	77	5:02:35:19.434
132	8:18:58:42.680	8:19:01:32.680	78	5:18:47:04.434
133	8:20:32:17.680	8:20:37:07.680	88	5:20:21:54.434
134	8:22:07:18.703	8:22:11:48.703	89	5:21:57:59.434
135	8:23:42:13.703	8:23:46:38.703	90	5:23:33:54.434
136	9:01:17:23.703	9:01:20:43.703	91	6:01:09:39.434
			102	6:18:56:24.430
			103	6:20:33:04.430
				6:20:31:39.430

TABLE I - RADAR ACQUISITION AND LOSS SUMMARY - Concluded

(b) Cape Kennedy - Concluded

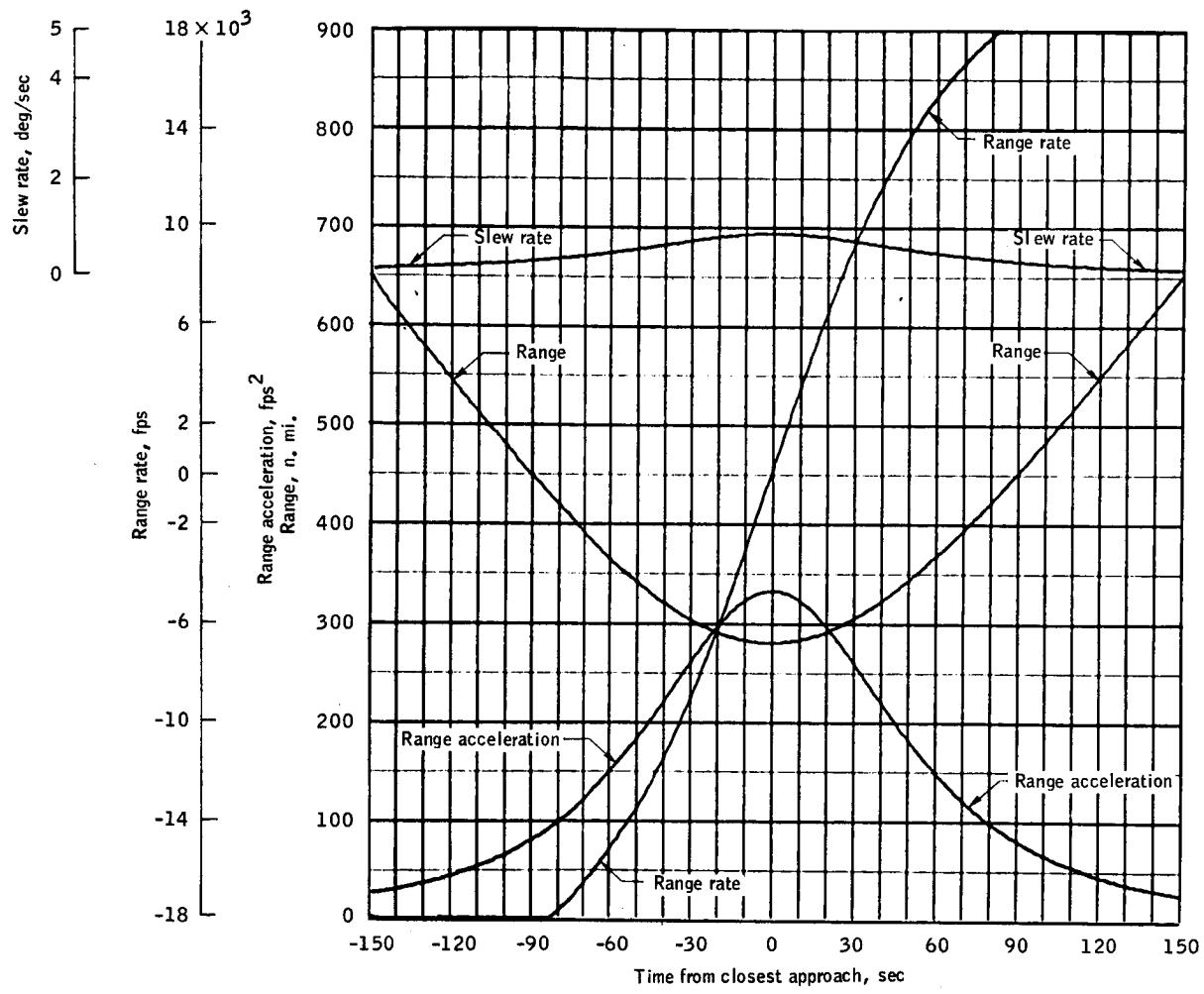
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104	6:22:08:09.430	6:22:13:49.420
105	6:23:43:54.430	6:23:49.24.430
106	7:01:20:00.906	7:01:24:15.906
116	7:17:27.32.680	7:17:30.57.680
117	7:19:01:37.680	7:19:06:22.680
118	7:20:37.22.680	7:20:40:52.680
119	7:22:16:02.680	7:23:51:42.680
120	7:23:47:02.680	8:17:32:42.680
131	8:17:27:52.680	8:19:07:22.680
132	8:19:02:47.680	8:20:41:58.203
133	8:20:38:28.203	8:22:13:18.703
134	8:23:48:03.703	8:23:52:13.703
135	9:15:54:53.703	9:15:56:28.703
145	9:17:27.28.703	9:19:07:03.703
146	9:19:02:48.703	9:20:41:52.250
147	9:20:38:20.250	9:22:17:20.266
148	9:22:13:02.266	9:23:51:40.266
149	9:23:48:05.266	10:15:53:05.266
150	10:17:26:55.266	10:17:32:15.266
160		
161		

(c) Houston station - Concluded

Resolution number	Acquisition of signal, day hr min sec	Loss of signal, day hr min sec	Loss of signal, day hr min sec
73	4:20:14:46.824	4:21:52:26.824	4:23:26:51.824
74	4:23:21.1.824	5:00:55:46.824	5:01:01:56.824
75	5:02:51.34.434	5:20:19:09.434	5:20:24:54.434
76	5:21:54:29.434	5:23:30:29.434	5:23:36:09.434
77	6:01:06.19.434	6:01:11.49.434	6:02:46:34.430
88	6:03:22.4.430	6:18:58:34.430	6:20:35:14.430
89	6:22:10:44.430	6:23:46:19.430	6:23:46:19.430
90	6:24:40:54.430	7:01:21:44.430	7:19:03:17.680
91	7:18:58:57.680	7:20:38:12.680	7:22:12:57.680
92	7:20:33:37.680	7:22:48:22.680	7:23:48:22.680
102	7:22:09:07.680	8:01:23:02.680	8:19:04:37.680
103	7:22:43:57.680	8:20:39:07.680	8:22:13:58.703
104	8:23:44:48.703	9:01:22:48.703	9:17:29:13.703
105	9:18:59:18.703	9:20:39:00.250	9:22:14:00.266
106	9:22:09:55.266	9:23:44:35.266	9:23:49:05.266
117	10:17:24:20.266		10:17:29:05.266
132			
133			
134			
135			
136			
146			
147			
148			
149			
150			
161			

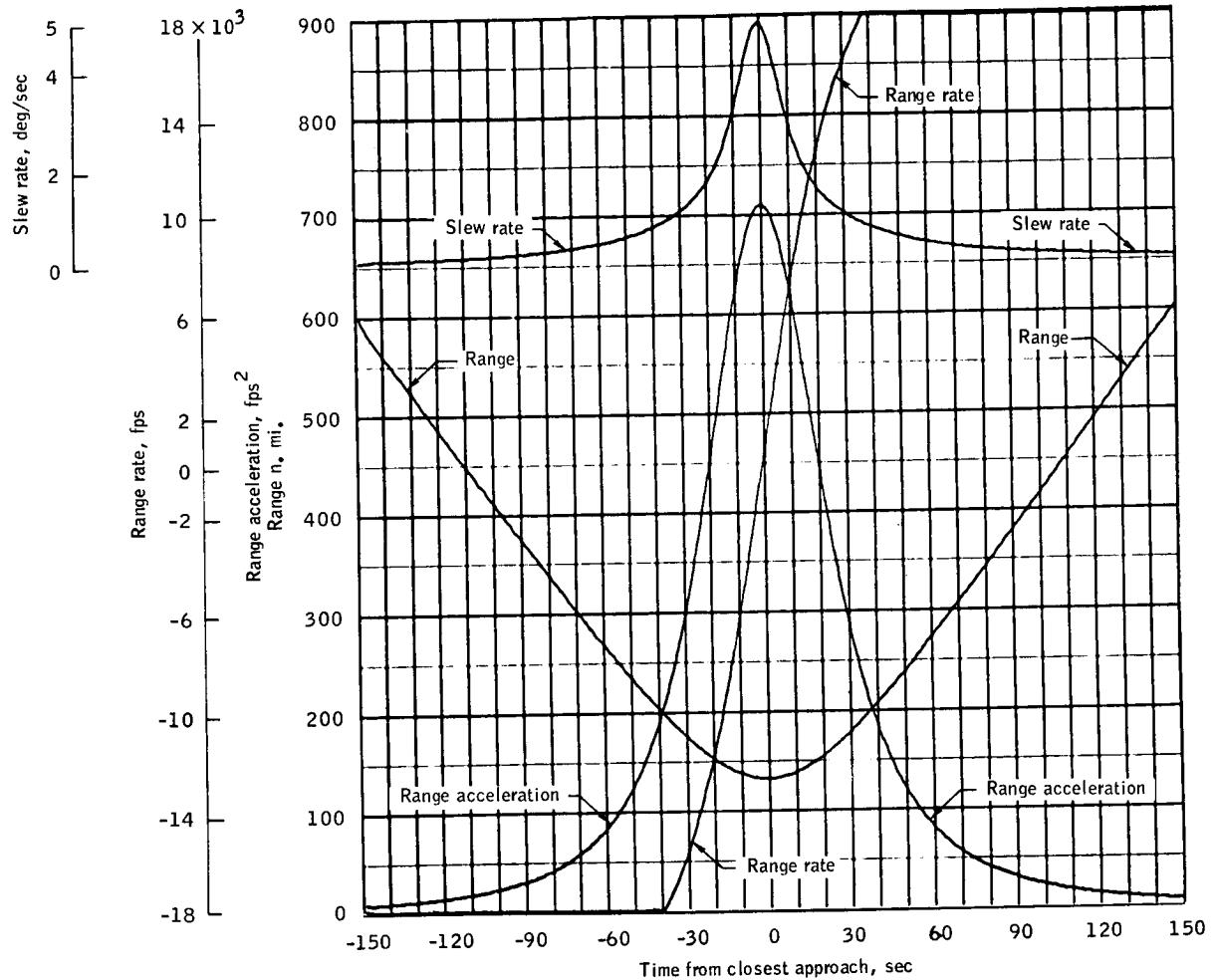
(c) Houston station

1	0:01:34:21.630	0:01:40:01.630
2	0:03:09:13.010	0:03:14:53.010
3	0:04:43:55.010	0:04:49:35.010
4	0:06:19:15.010	0:06:23:05.010
15	0:23:54:20.010	0:23:59:45.010
16	1:01:28:55.010	1:01:34:25.010
17	1:03:03:10.519	1:03:09:30.519
18	1:05:38:50.718	1:04:44:40.718
29	1:22:13:56.854	1:22:17:41.854
30	1:24:47:16.854	1:23:52:56.854
31	2:01:21:56.854	2:01:27:21.854
32	2:07:56:26.854	2:03:02:01.854
33	2:08:31:11.854	2:04:36:06.854
44	2:22:05:16.854	2:22:10:06.854
45	2:23:33:06.854	2:23:44:51.854
46	3:01:13:46.852	3:01:19:16.852
47	3:02:48:21.852	3:02:53:51.852
48	3:04:22:16.852	3:04:27:16.052
59	3:2:56:11.852	3:22:01:36.852
60	3:23:30:26.852	3:23:36:06.825
61	4:01:05:06.824	4:01:10:36.824
62	4:02:39:36.824	4:02:45:01.824
63	4:04:15:06.824	4:04:17:41.824



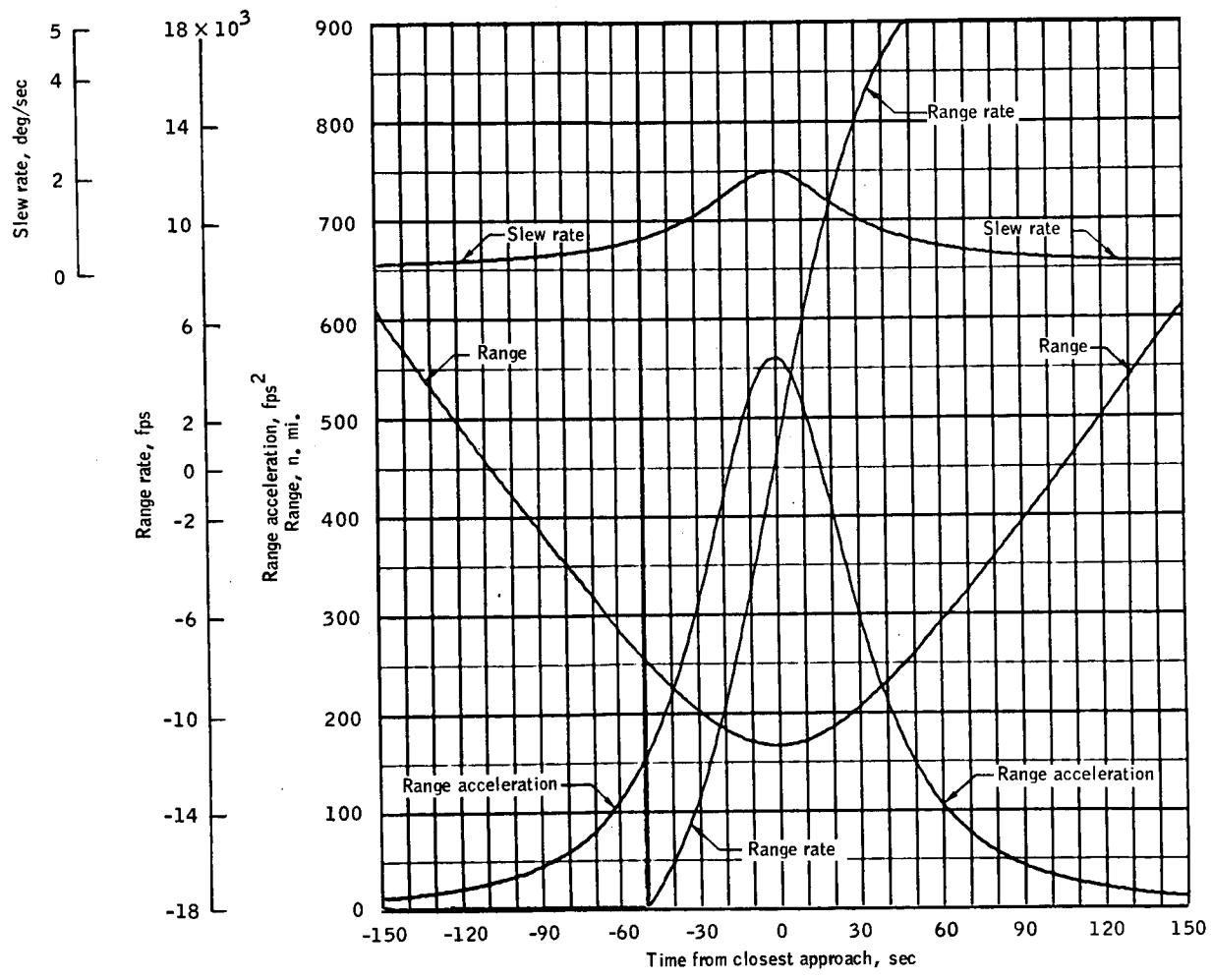
(a) Revolution 1.

Figure 1.- Radar data for White Sands missile range based on the Mission C reference trajectory.



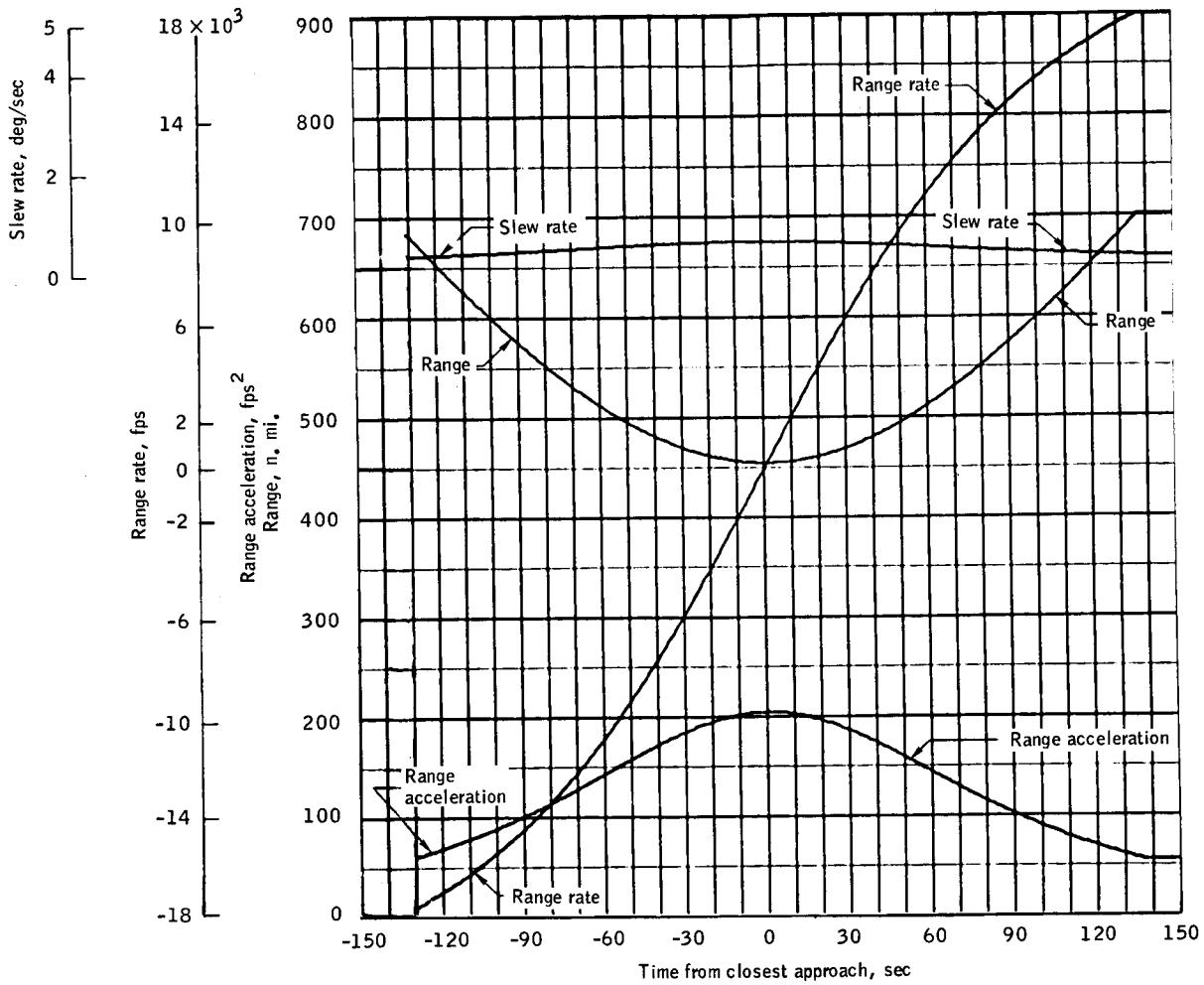
(b) Revolution 2.

Figure 1.- Continued.



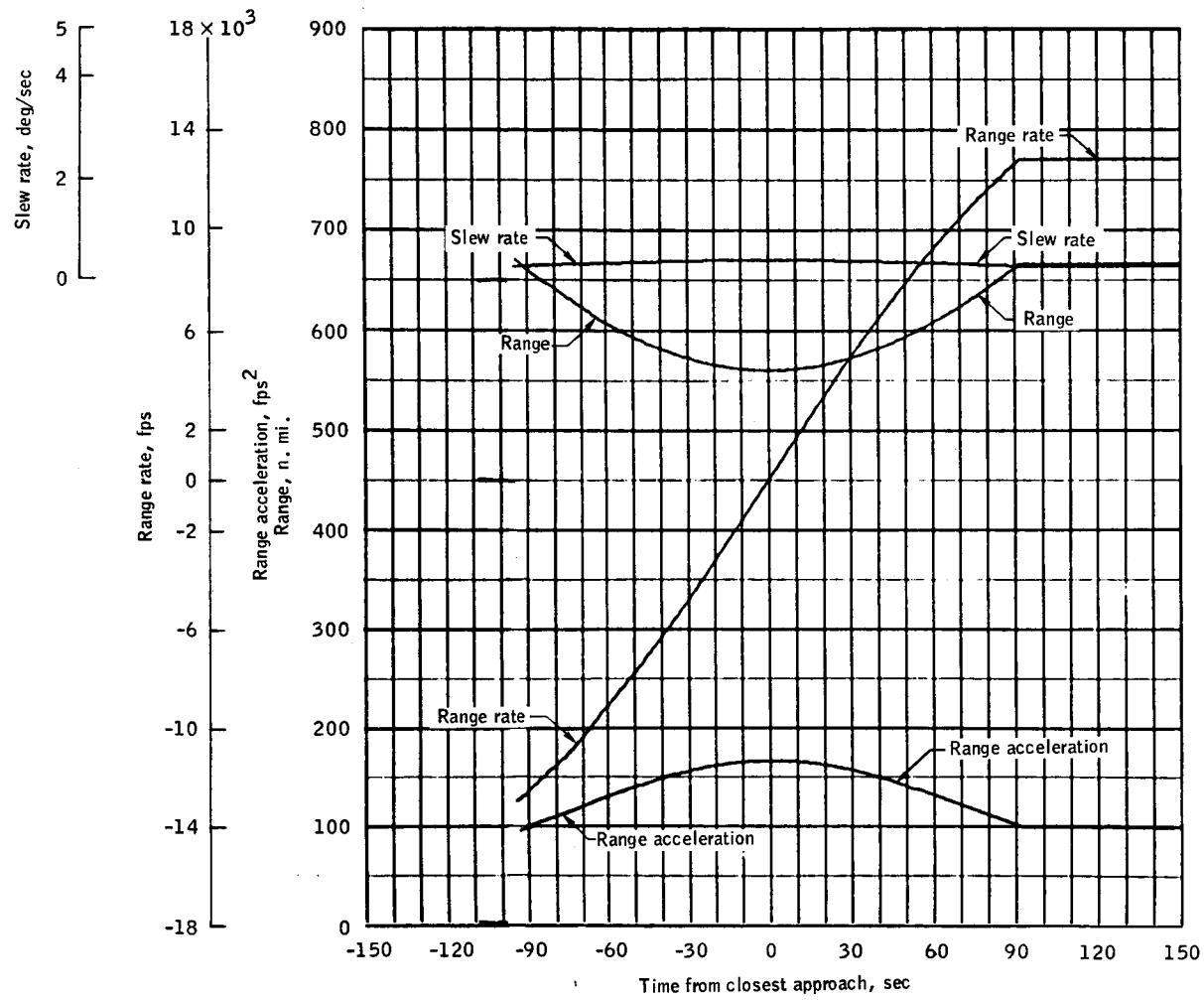
(c) Revolution 3.

Figure 1.- Continued.



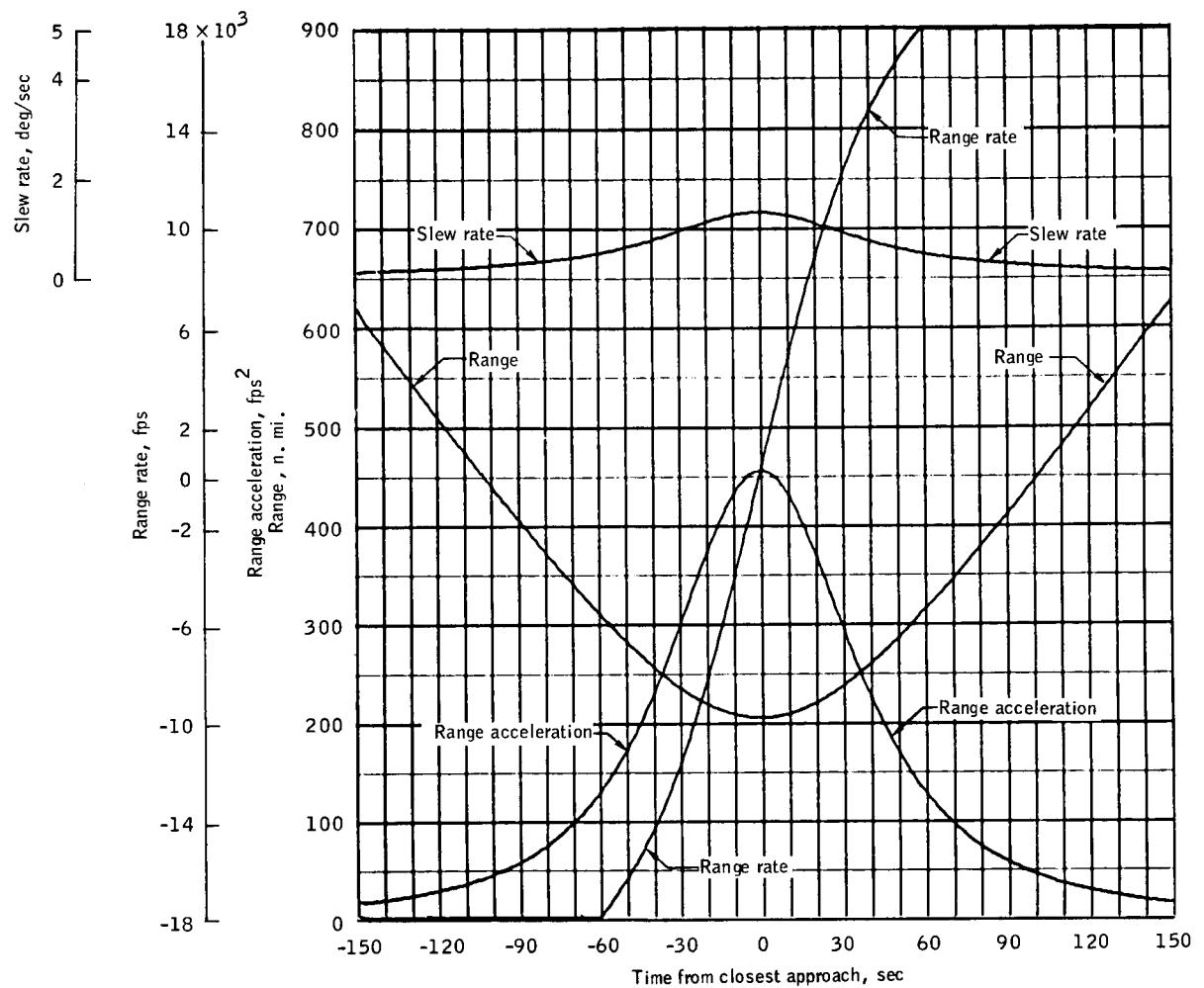
(d) Revolution 4.

Figure 1.- Continued.



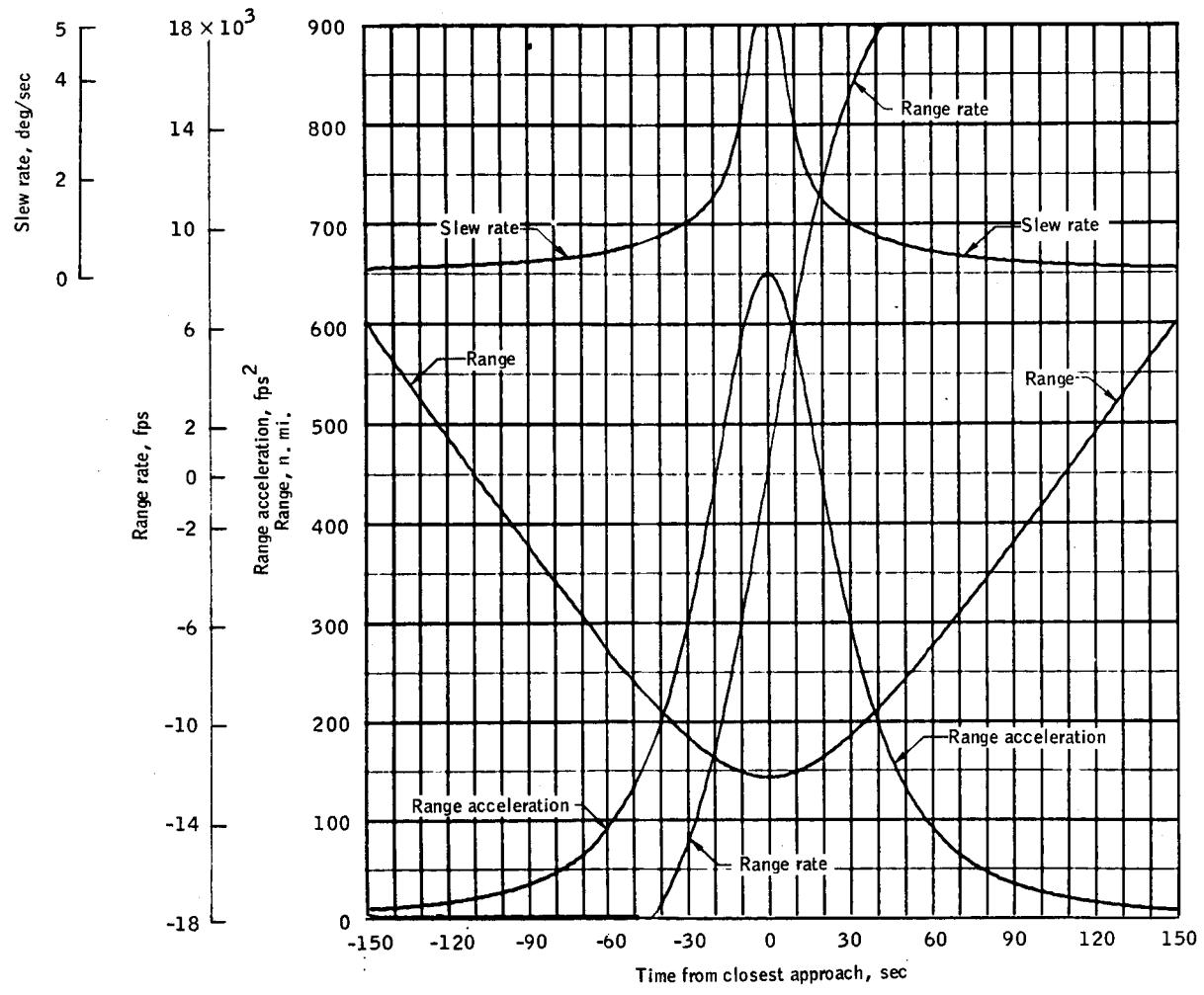
(e) Revolution 15.

Figure 1.- Continued.



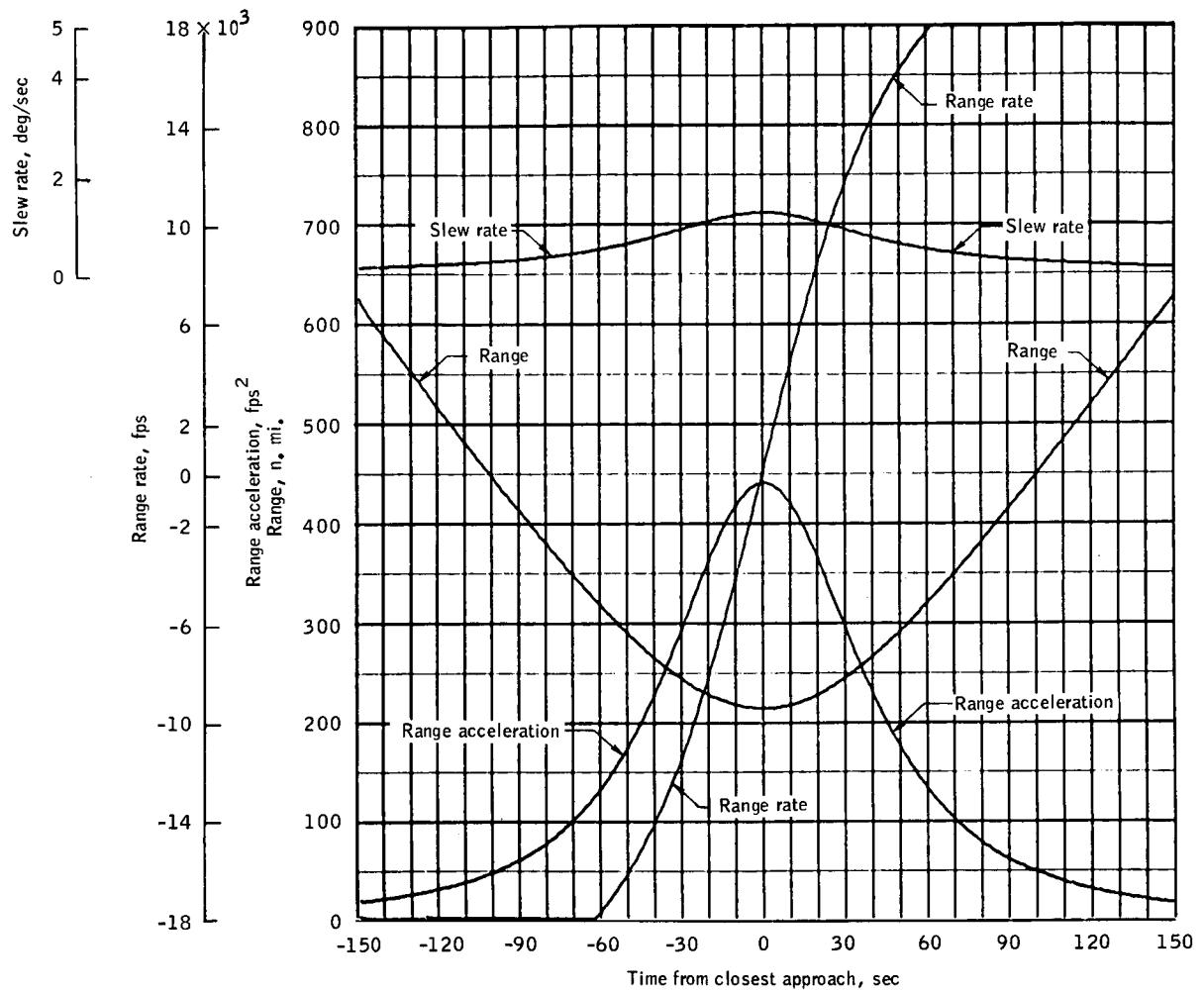
(f) Revolution 16.

Figure 1.- Continued.



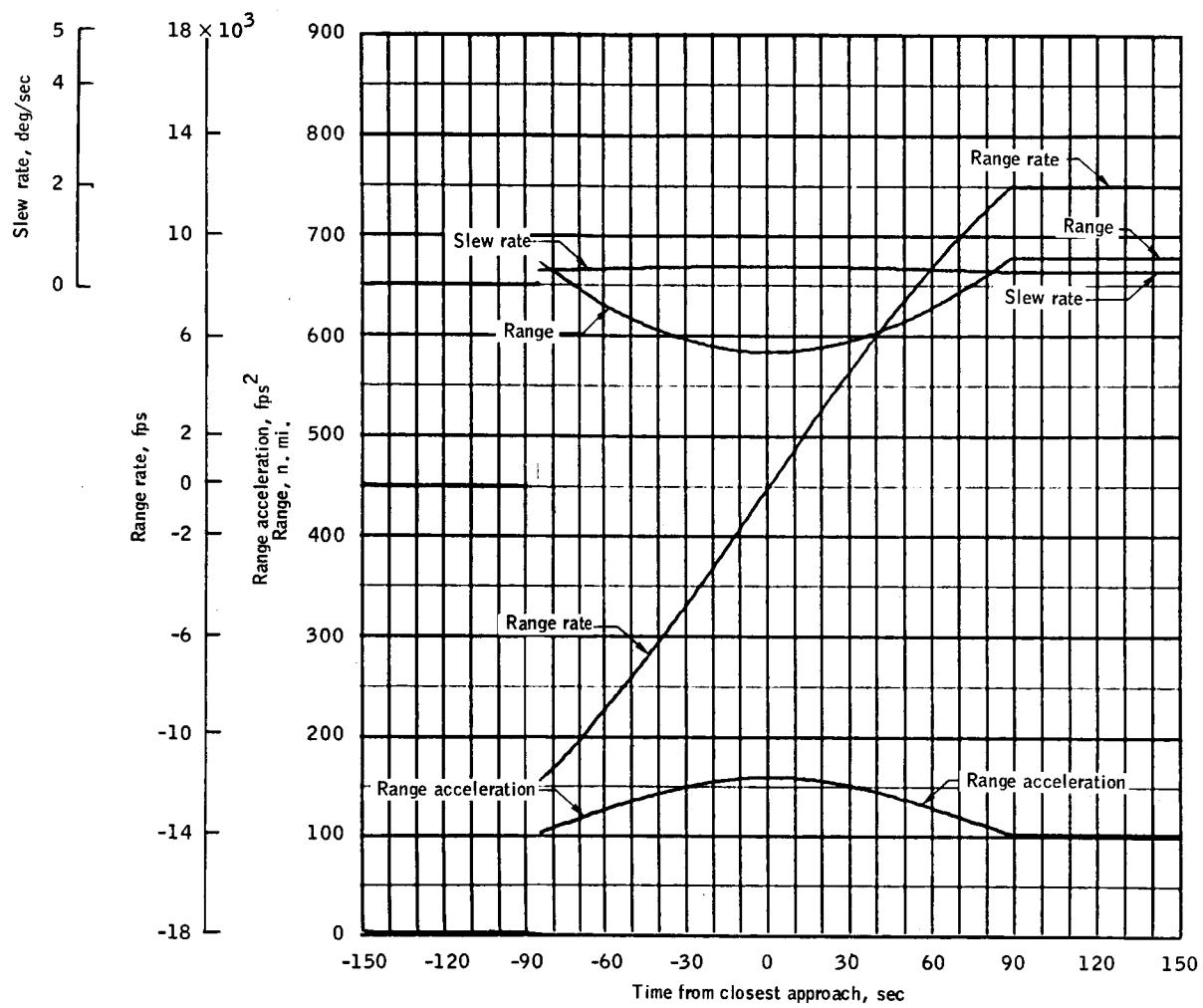
(g) Revolution 17.

Figure 1.- Continued.



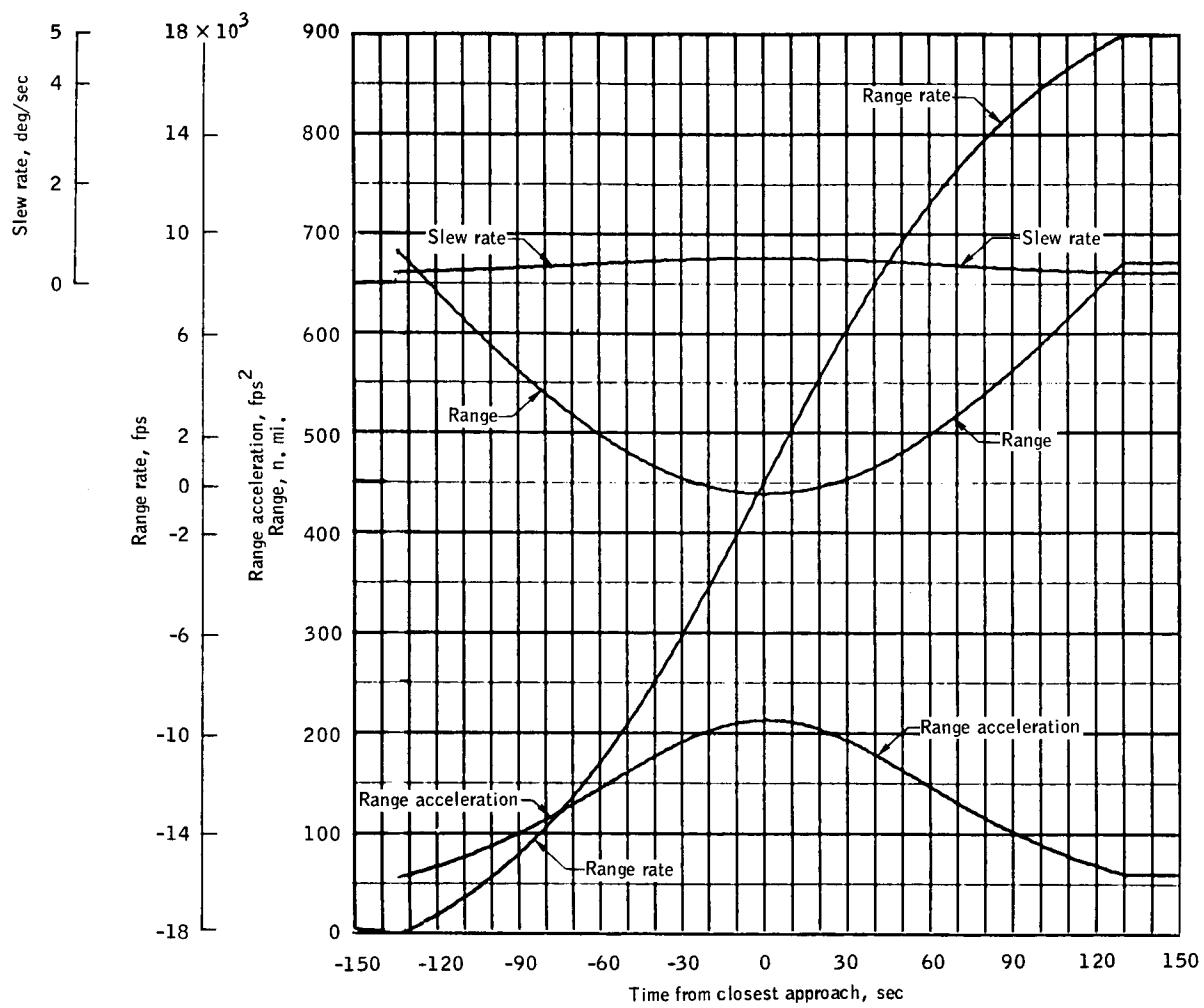
(h) Revolution 18.

Figure 1.- Continued.



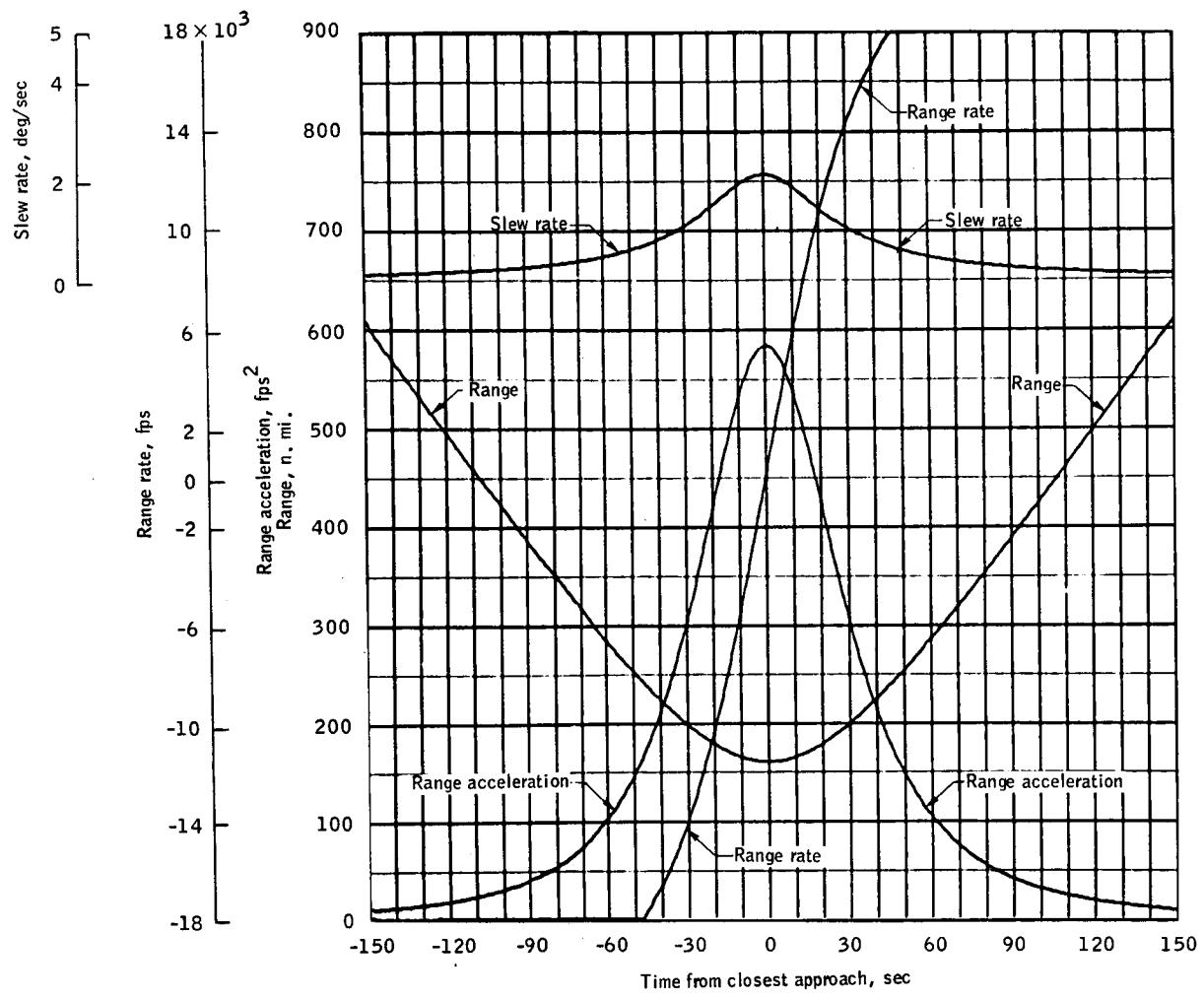
(i) Revolution 19.

Figure 1.- Continued.



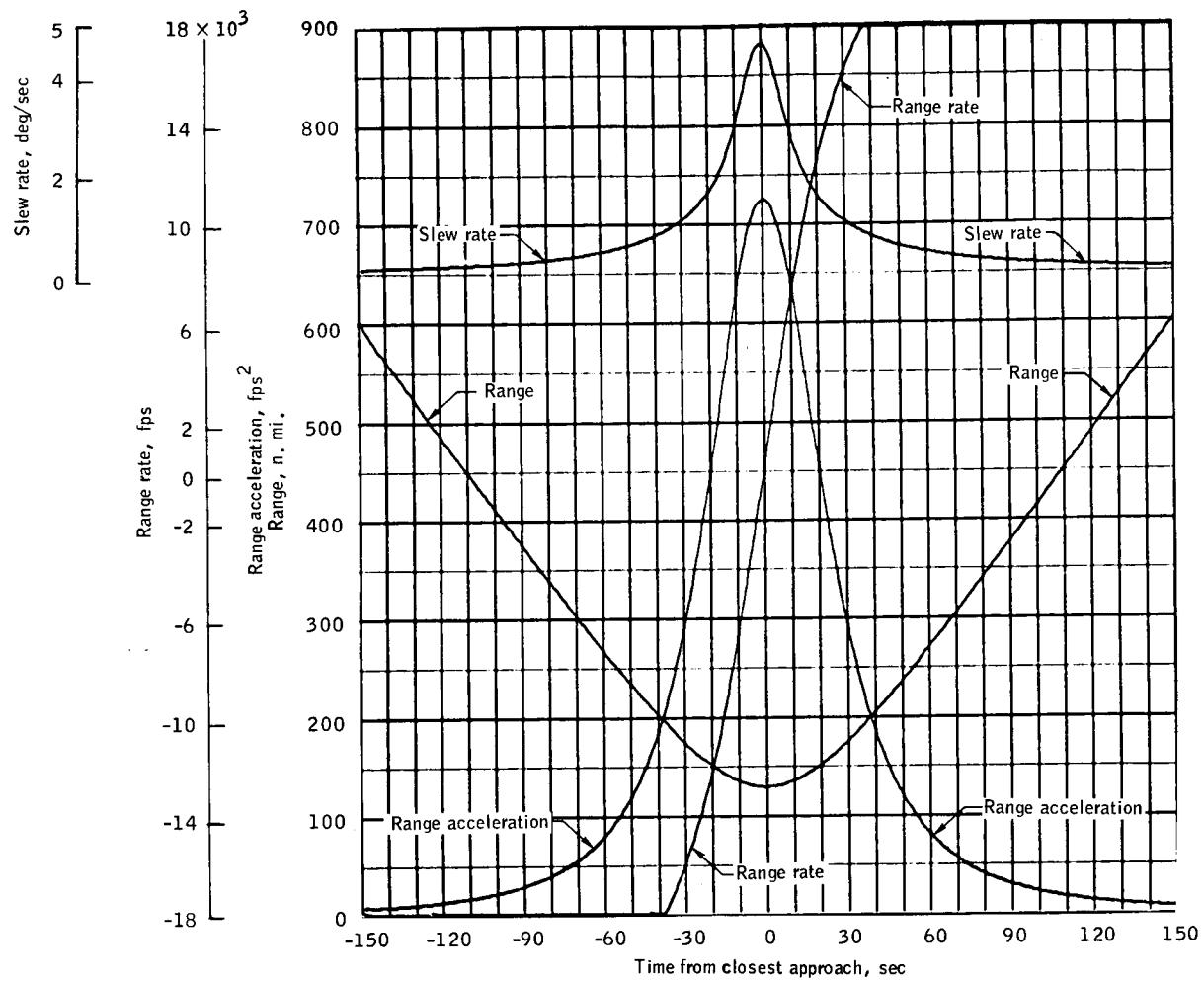
(j) Revolution 30.

Figure 1.- Continued.



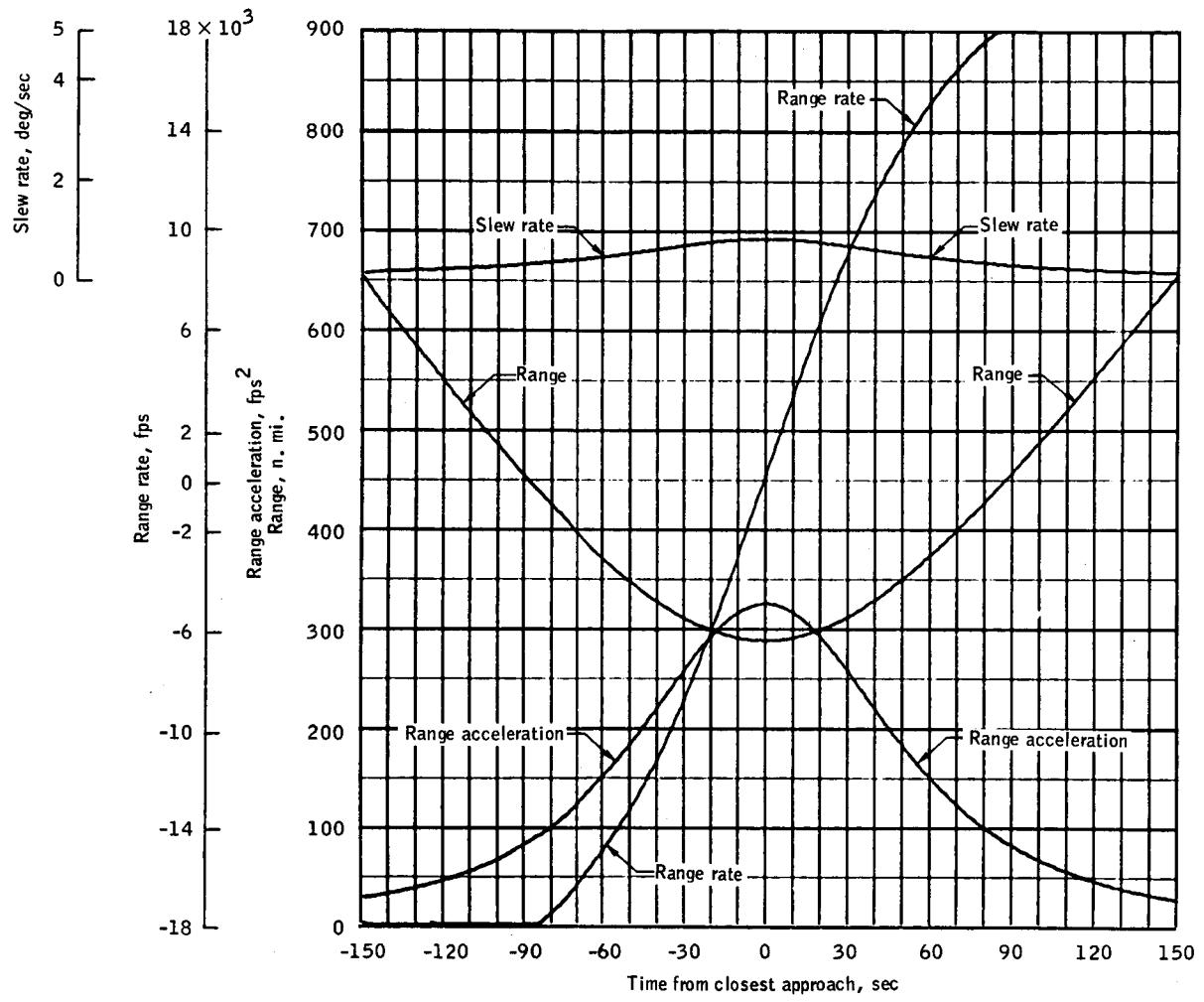
(k) Revolution 31.

Figure 1.- Continued.



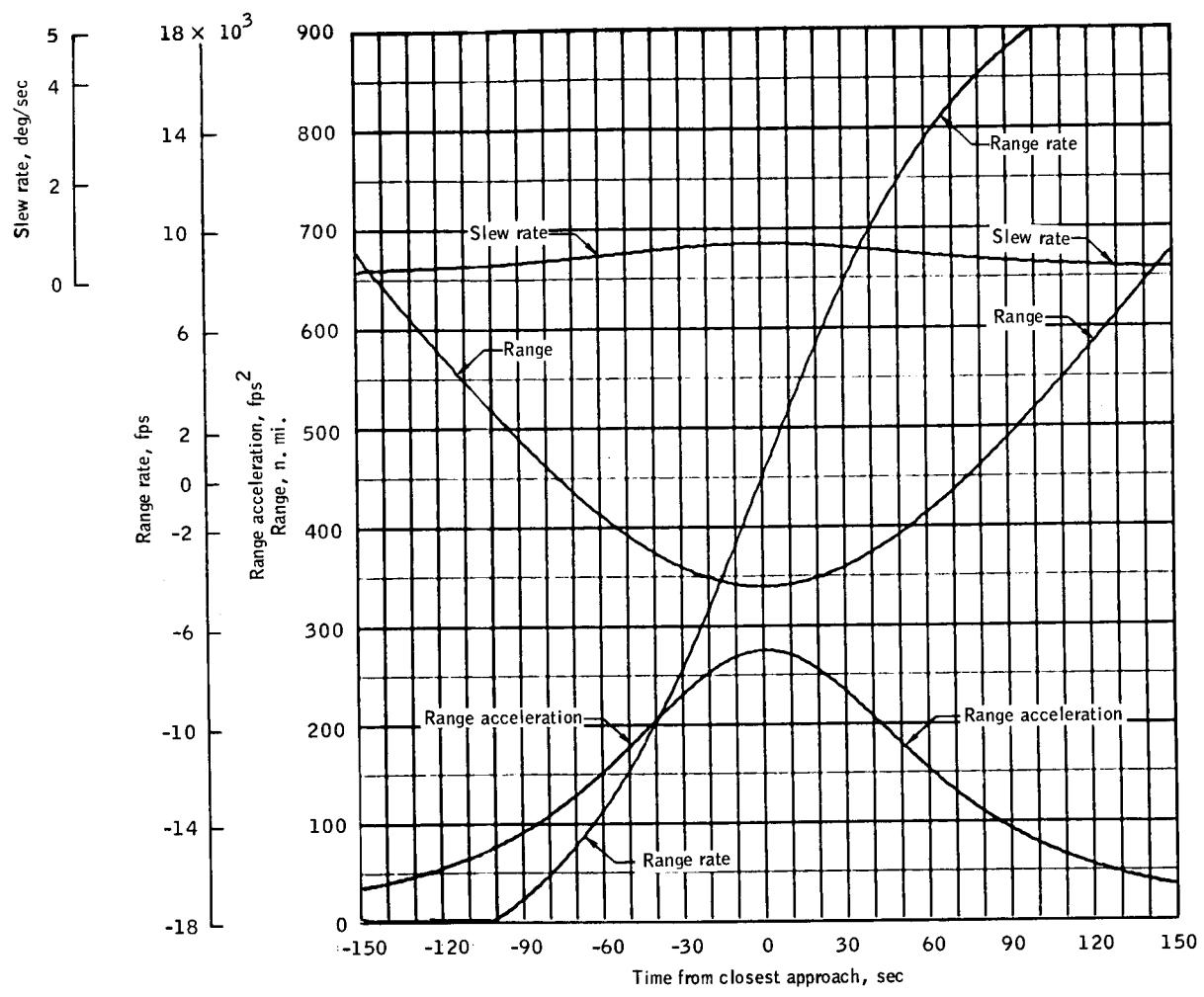
(I) Revolution 32.

Figure 1.- Continued.



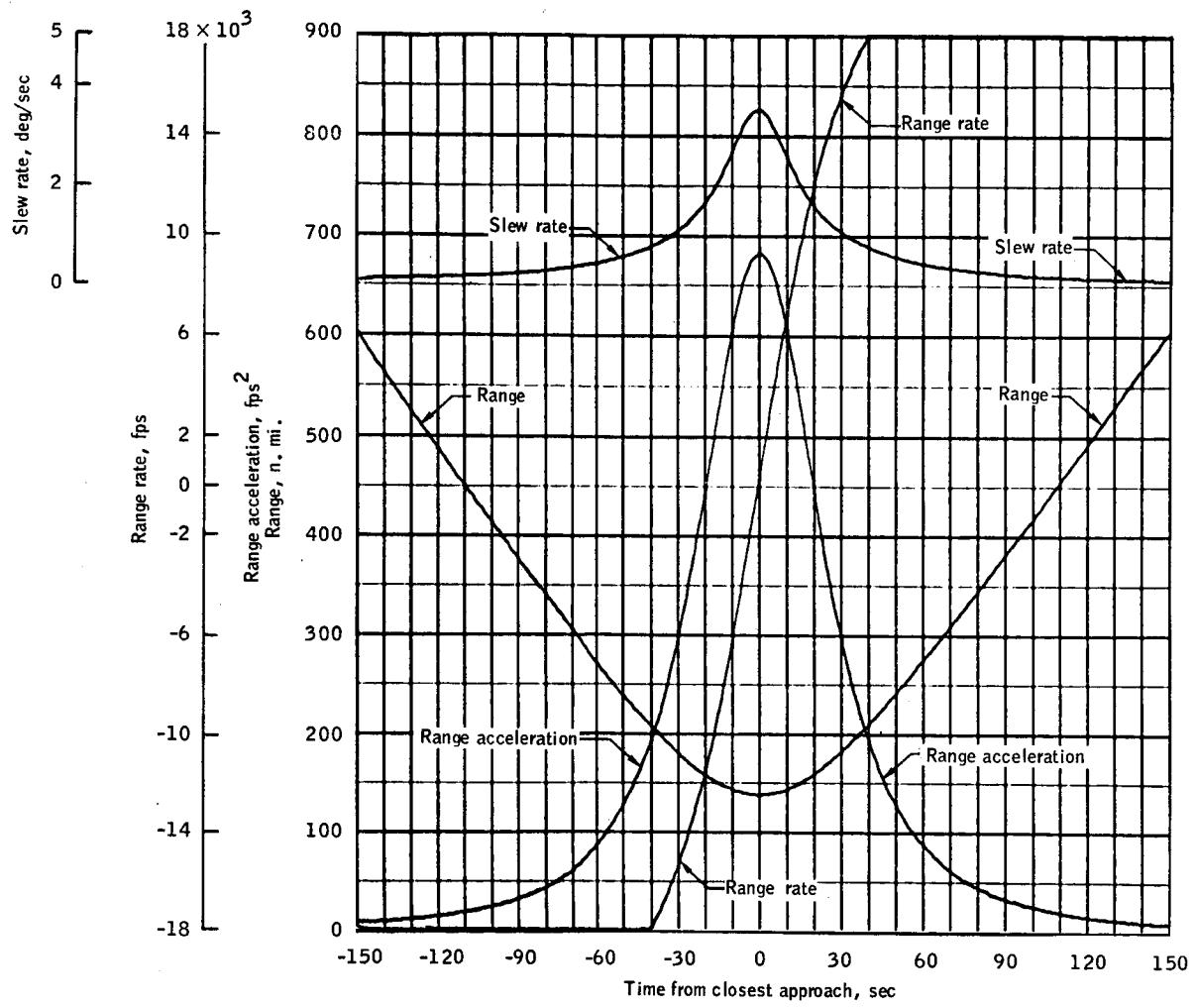
(m) Revolution 33.

Figure 1.- Continued.



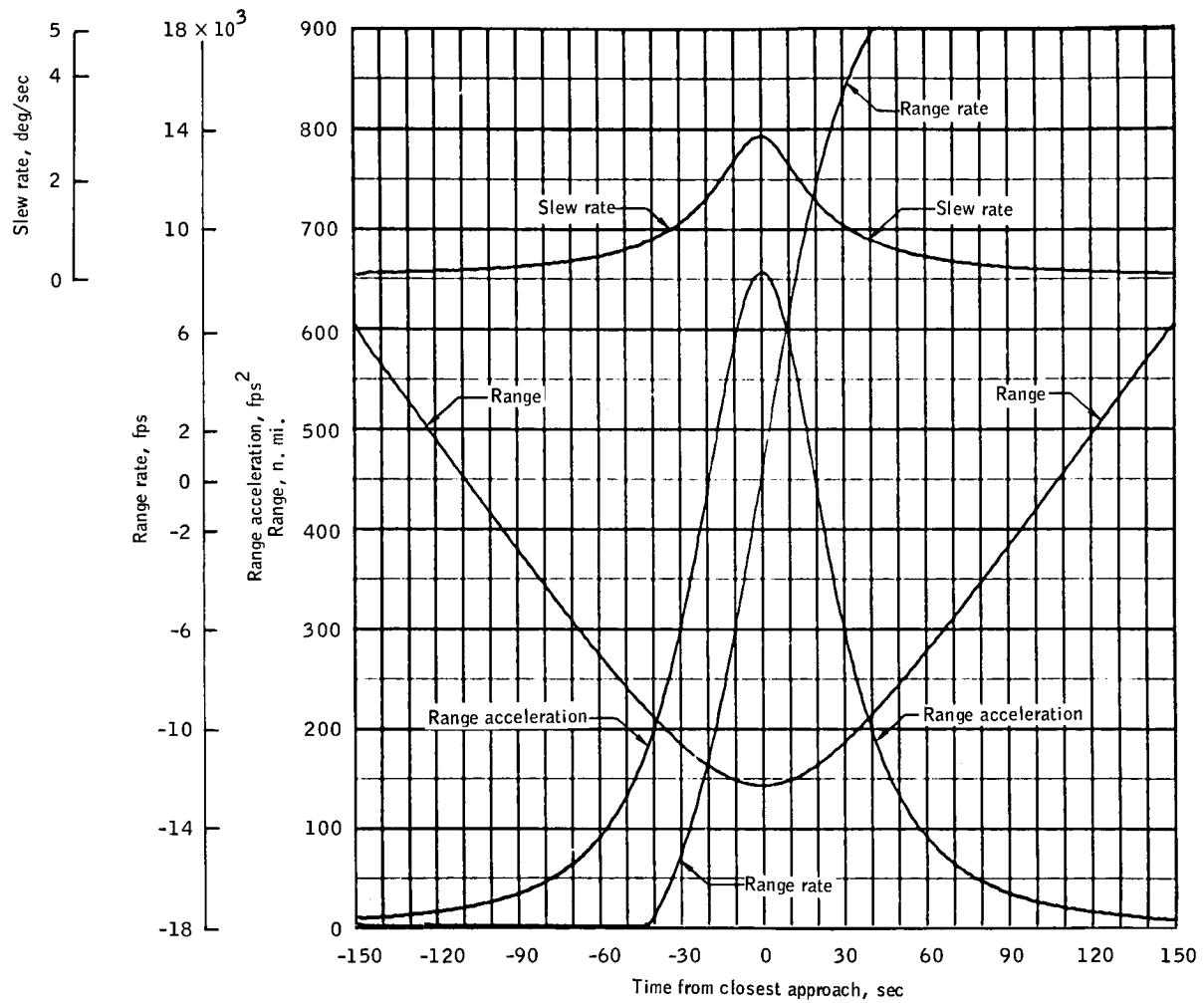
(n) Revolution 45.

Figure 1.- Continued.



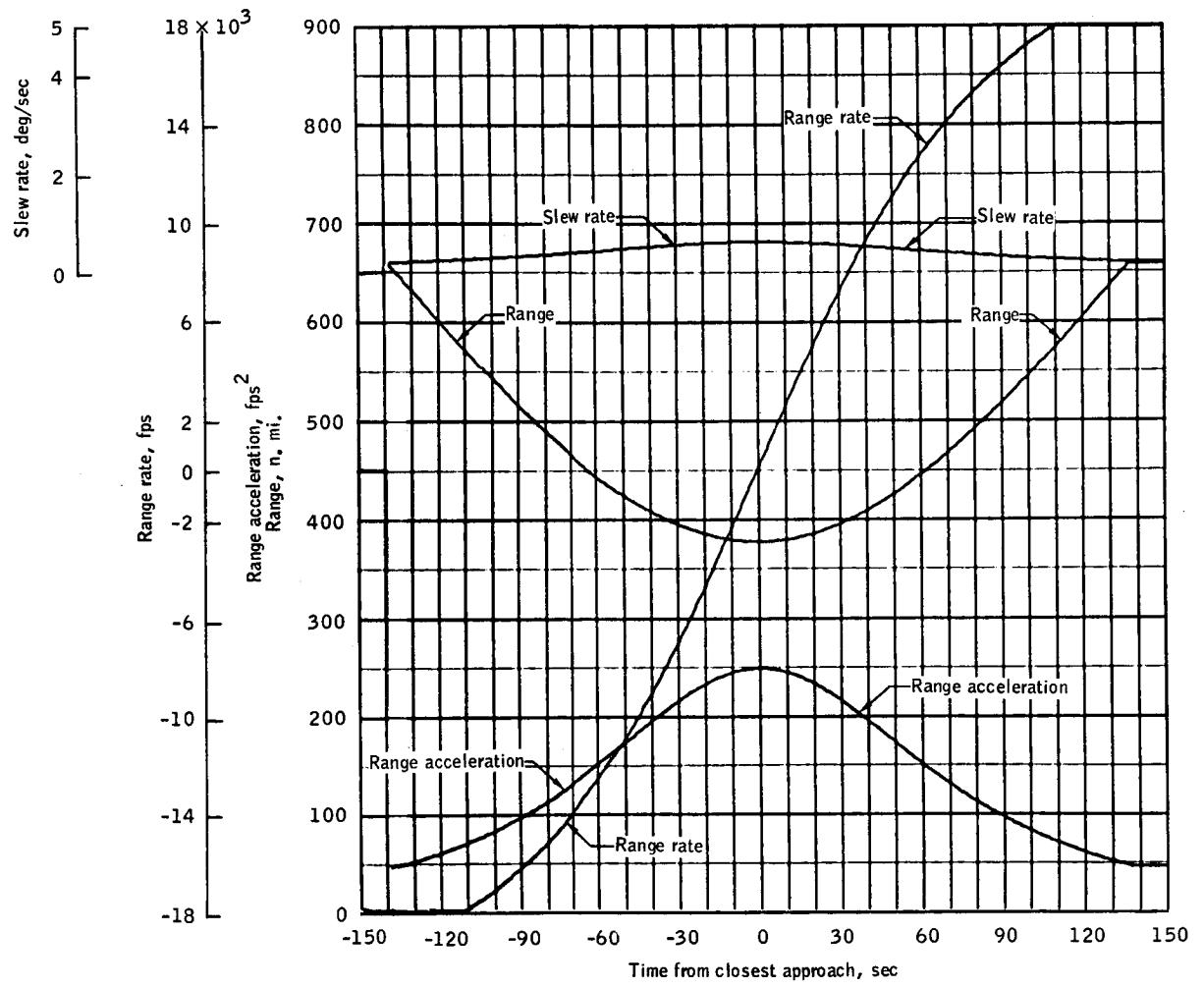
(o) Revolution 46.

Figure 1.- Continued.



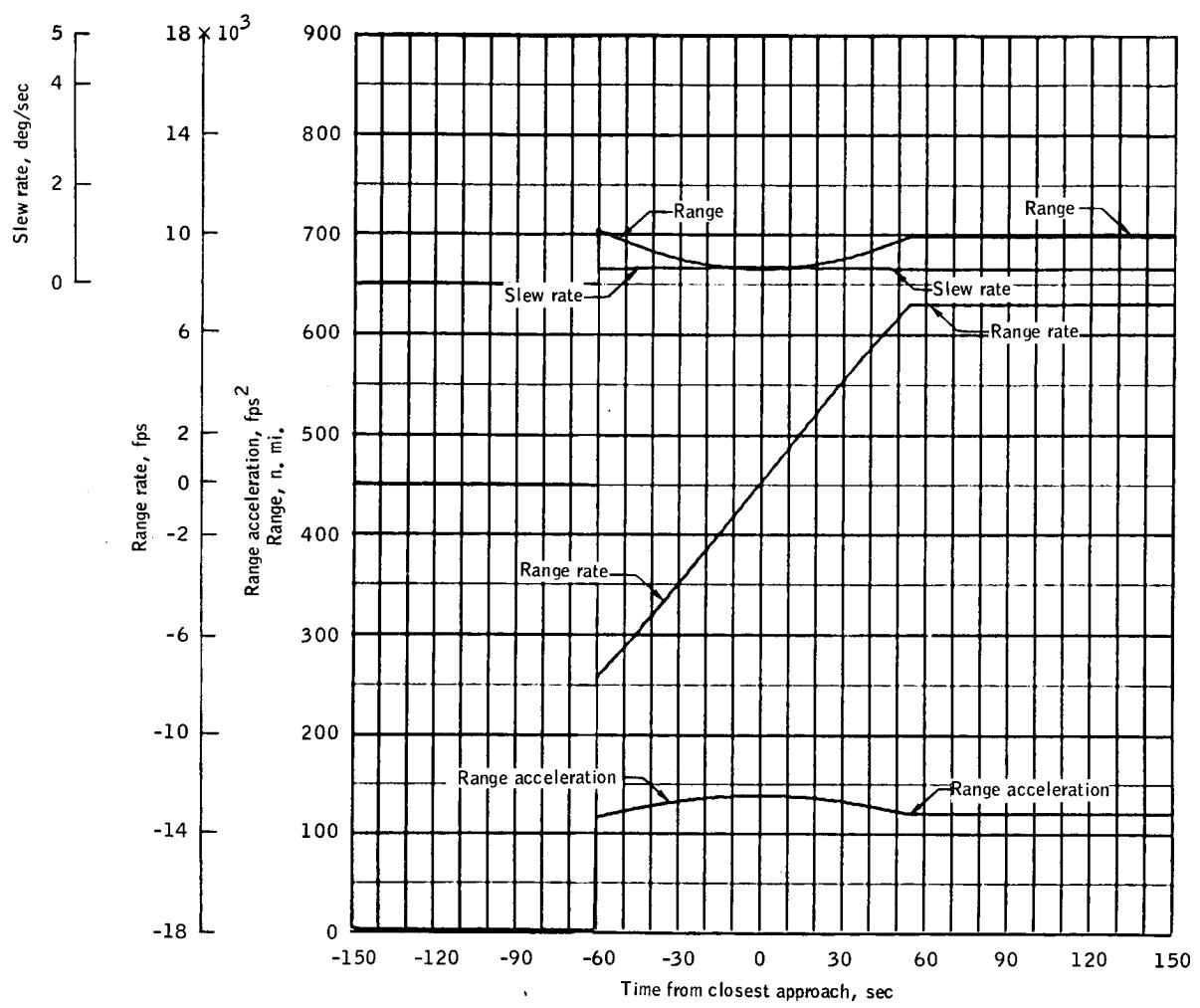
(p) Revolution 47.

Figure 1.- Continued.



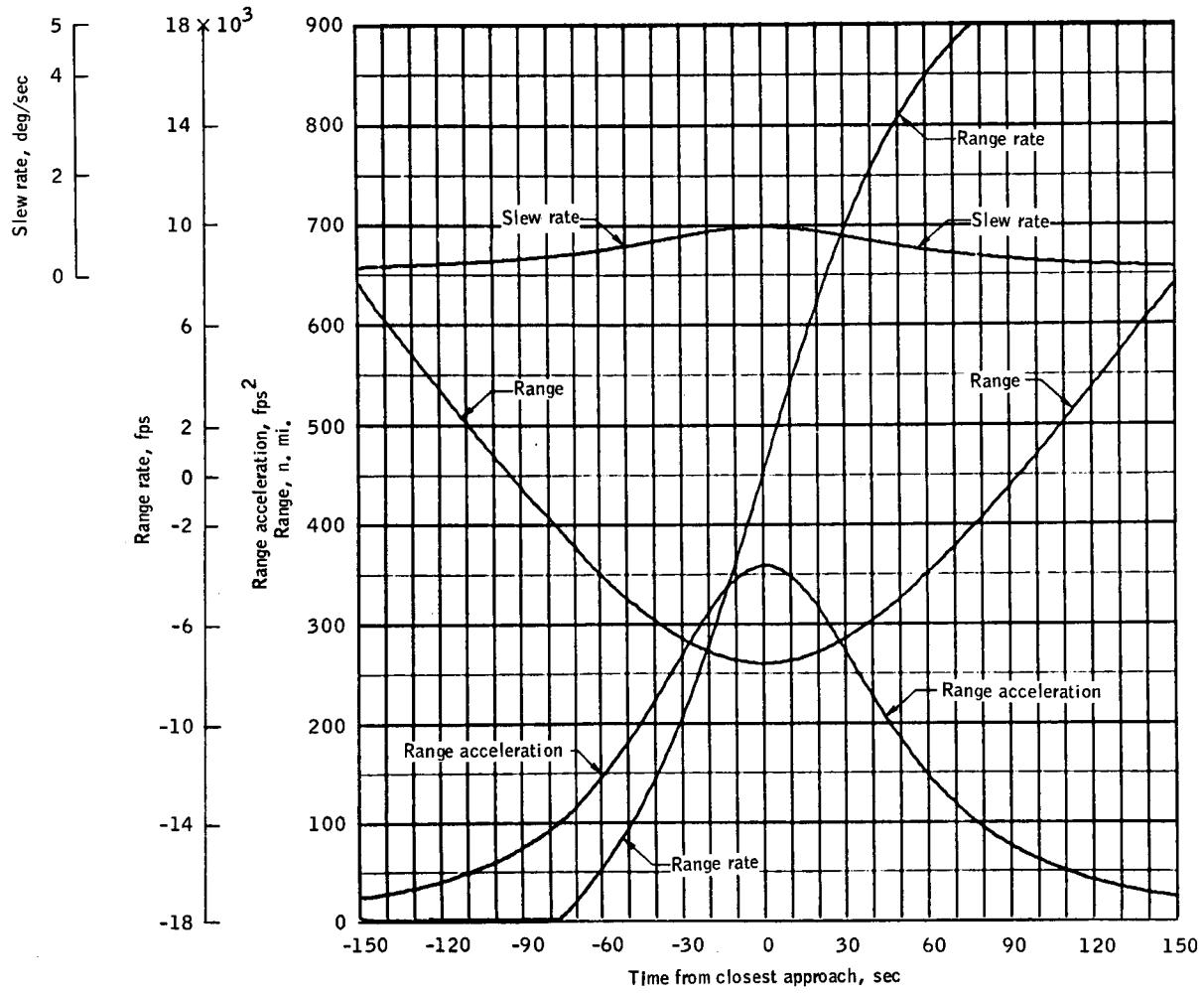
(q) Revolution 48.

Figure 1.- Continued.



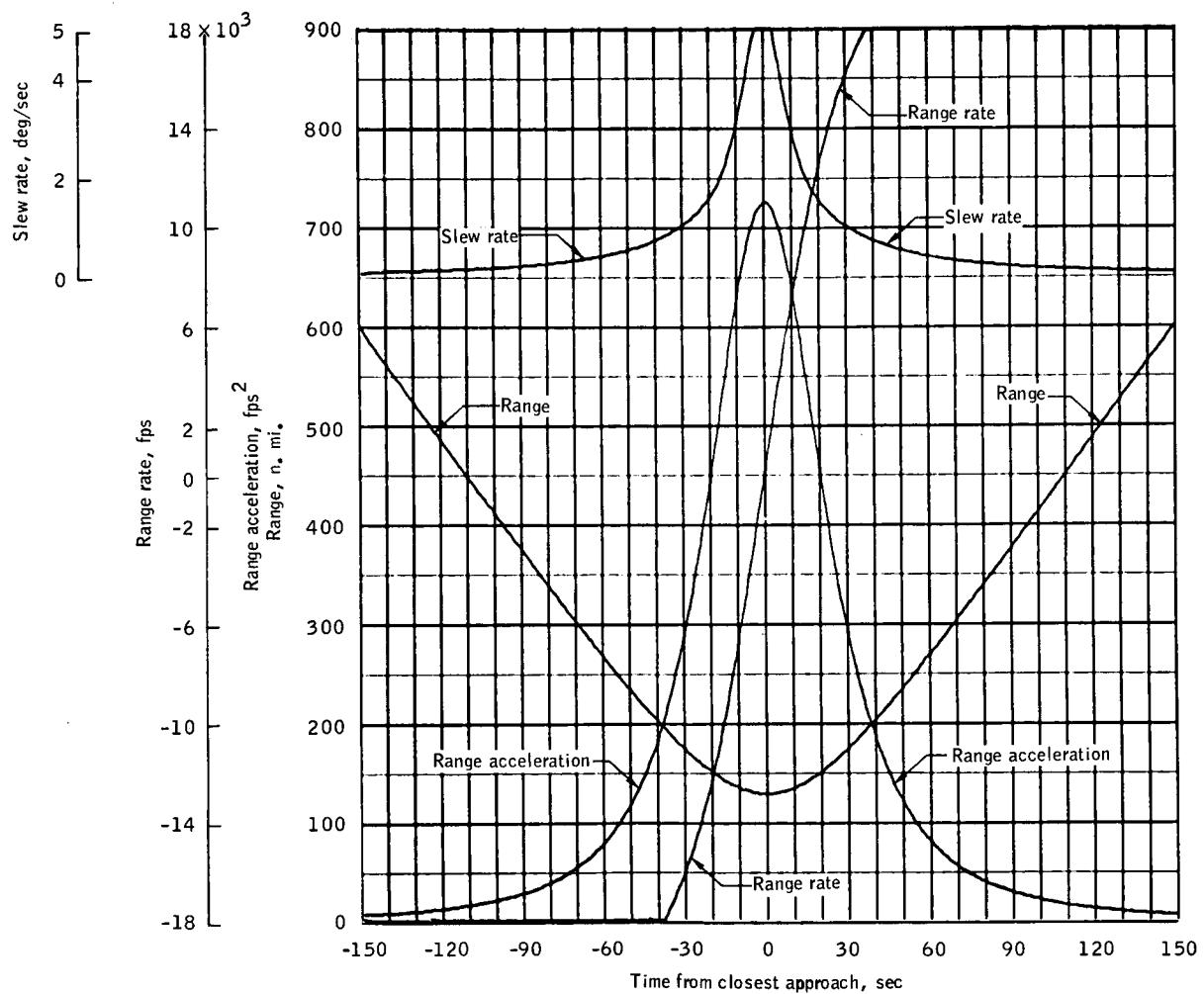
(r) Revolution 59.

Figure 1.- Continued.



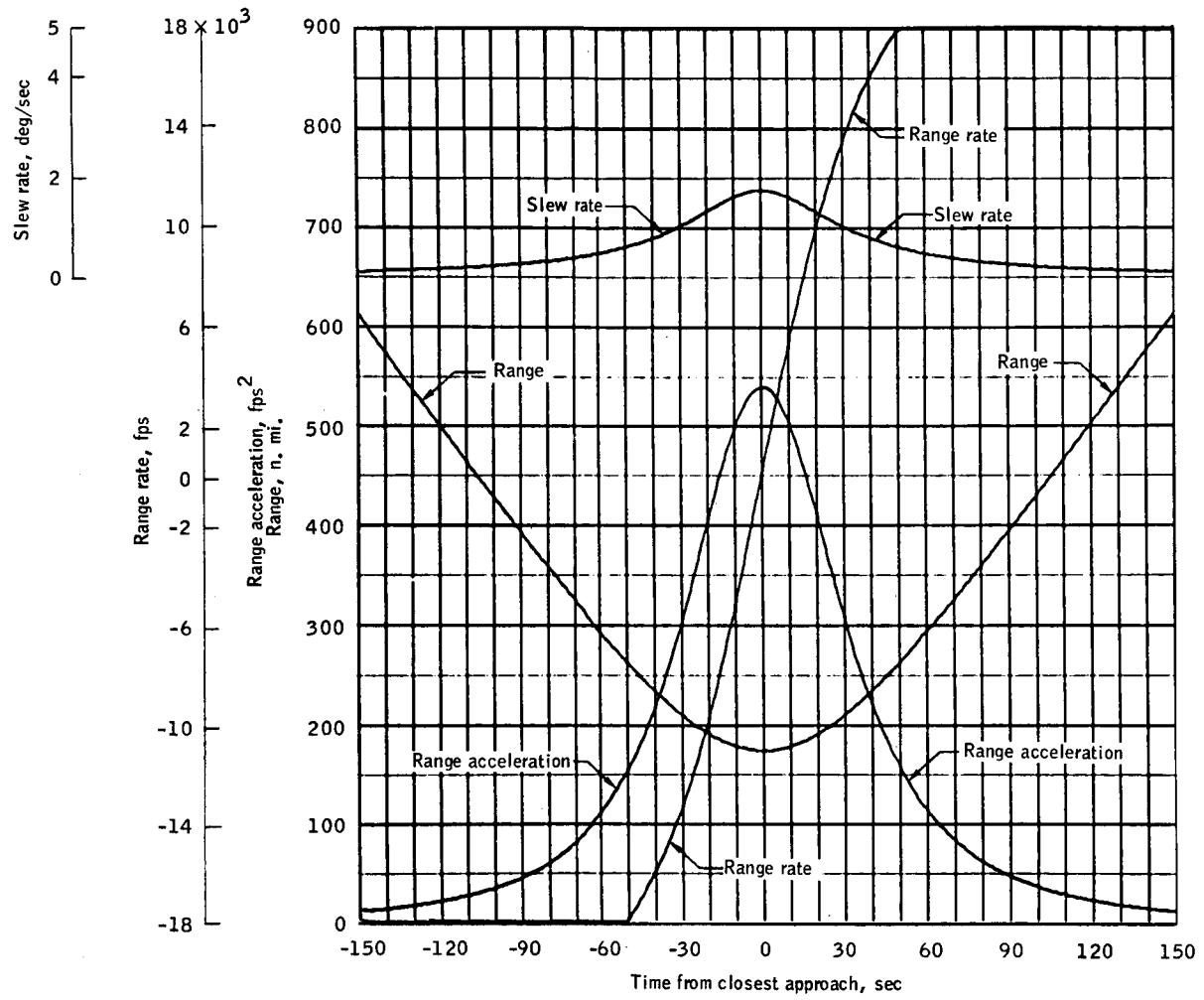
(s) Revolution 60.

Figure 1.- Continued.



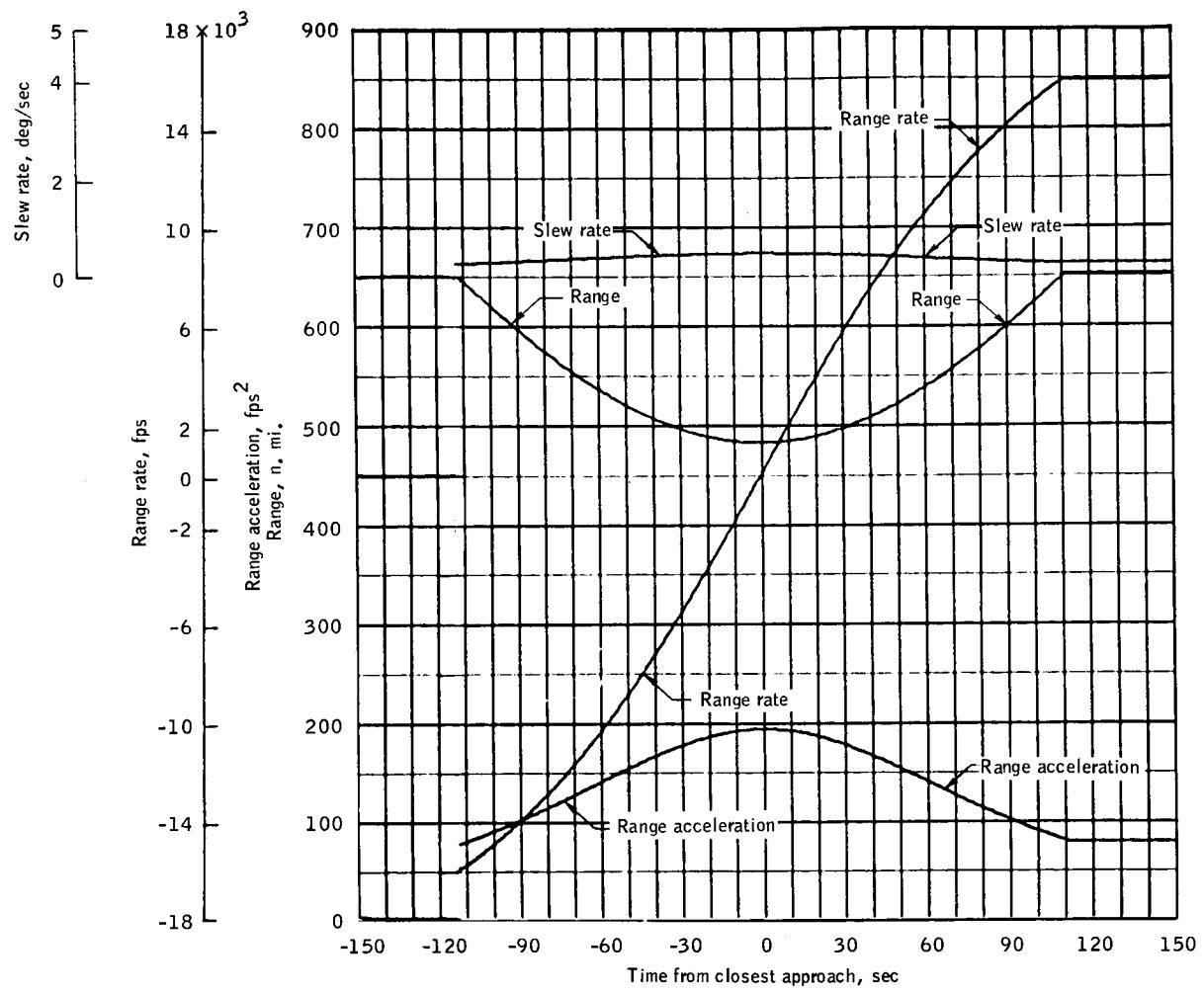
(t) Revolution 61.

Figure 1.- Continued.



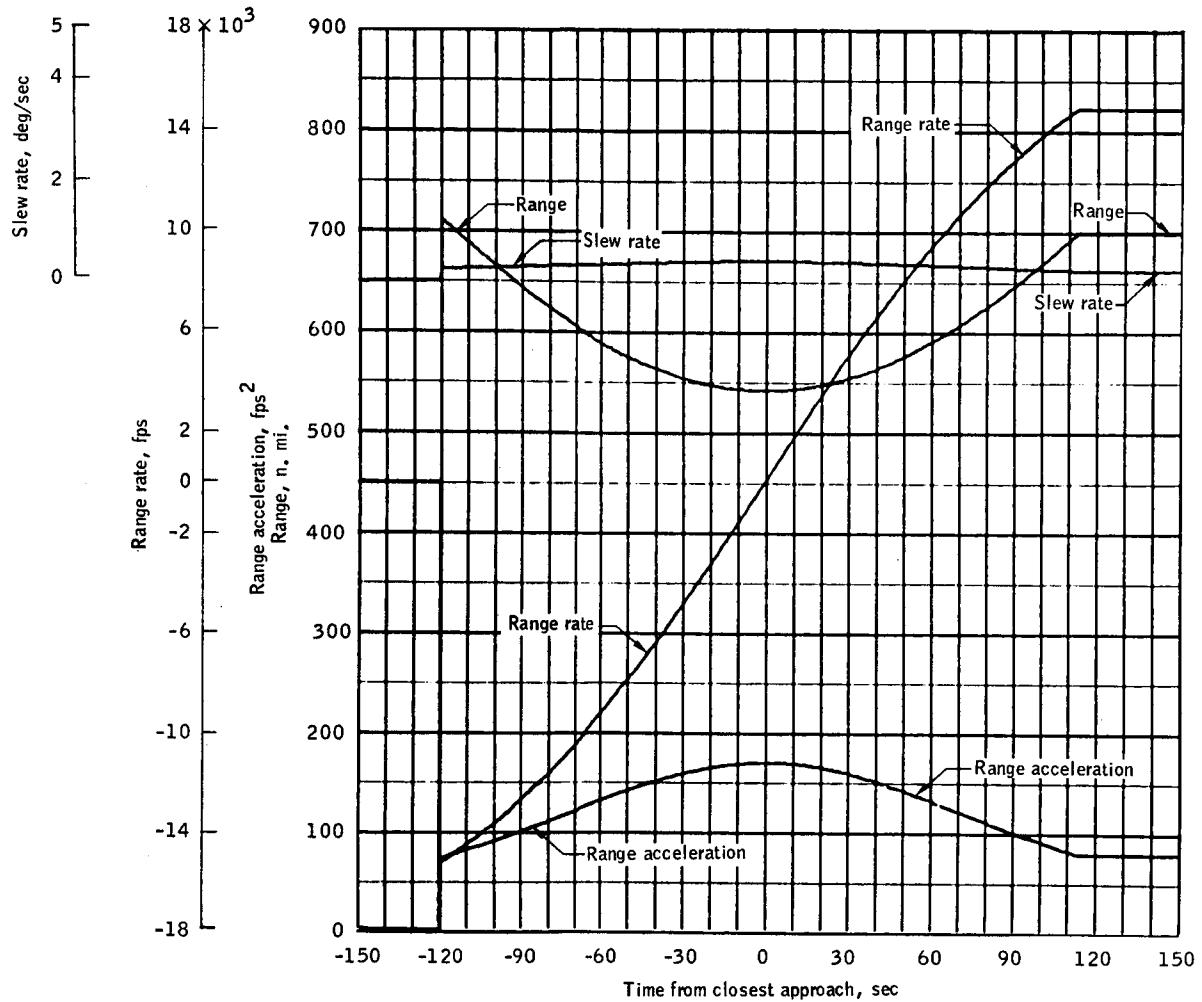
(u) Revolution 62.

Figure 1.- Continued.



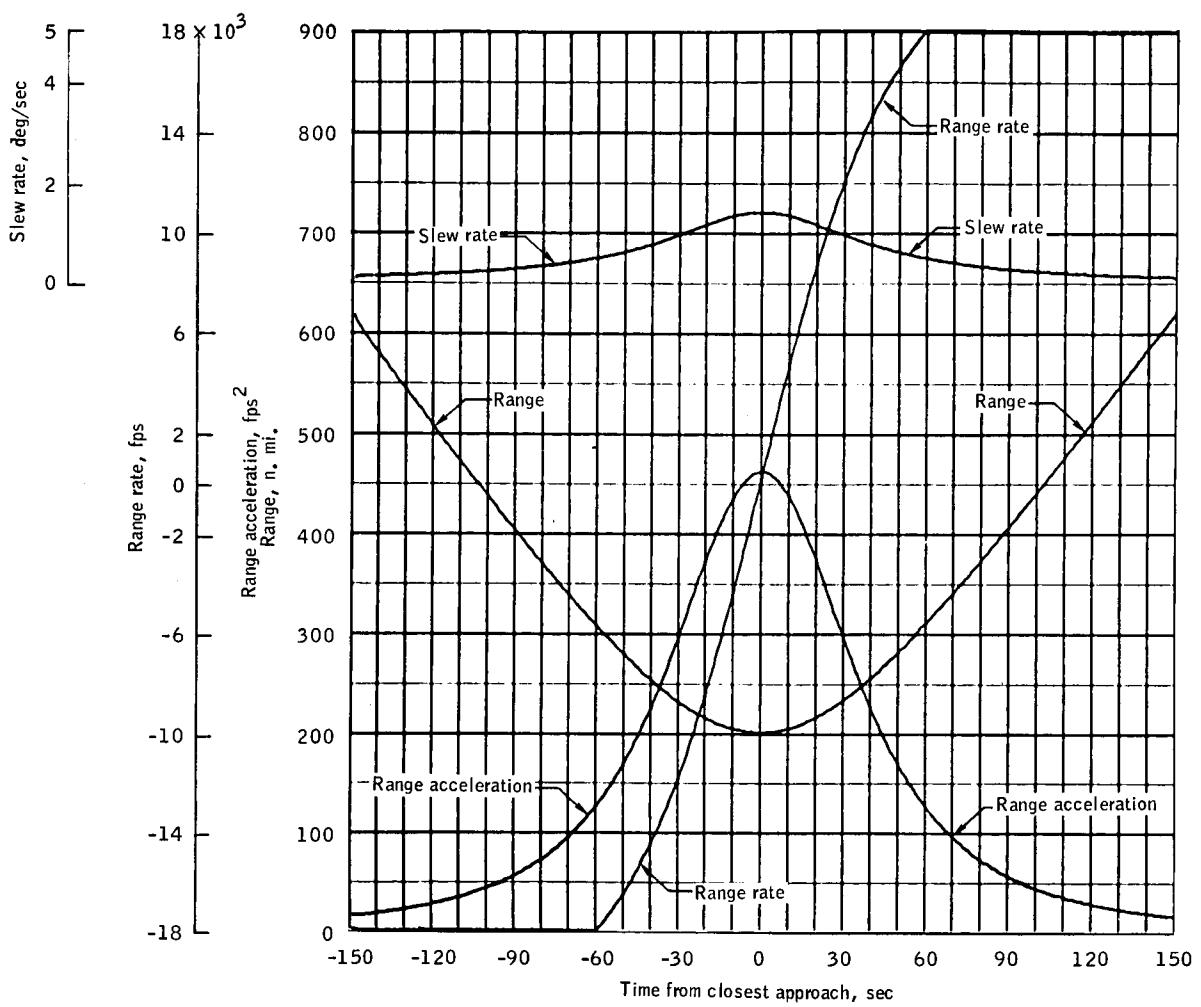
(v) Revolution 63.

Figure 1.- Continued.



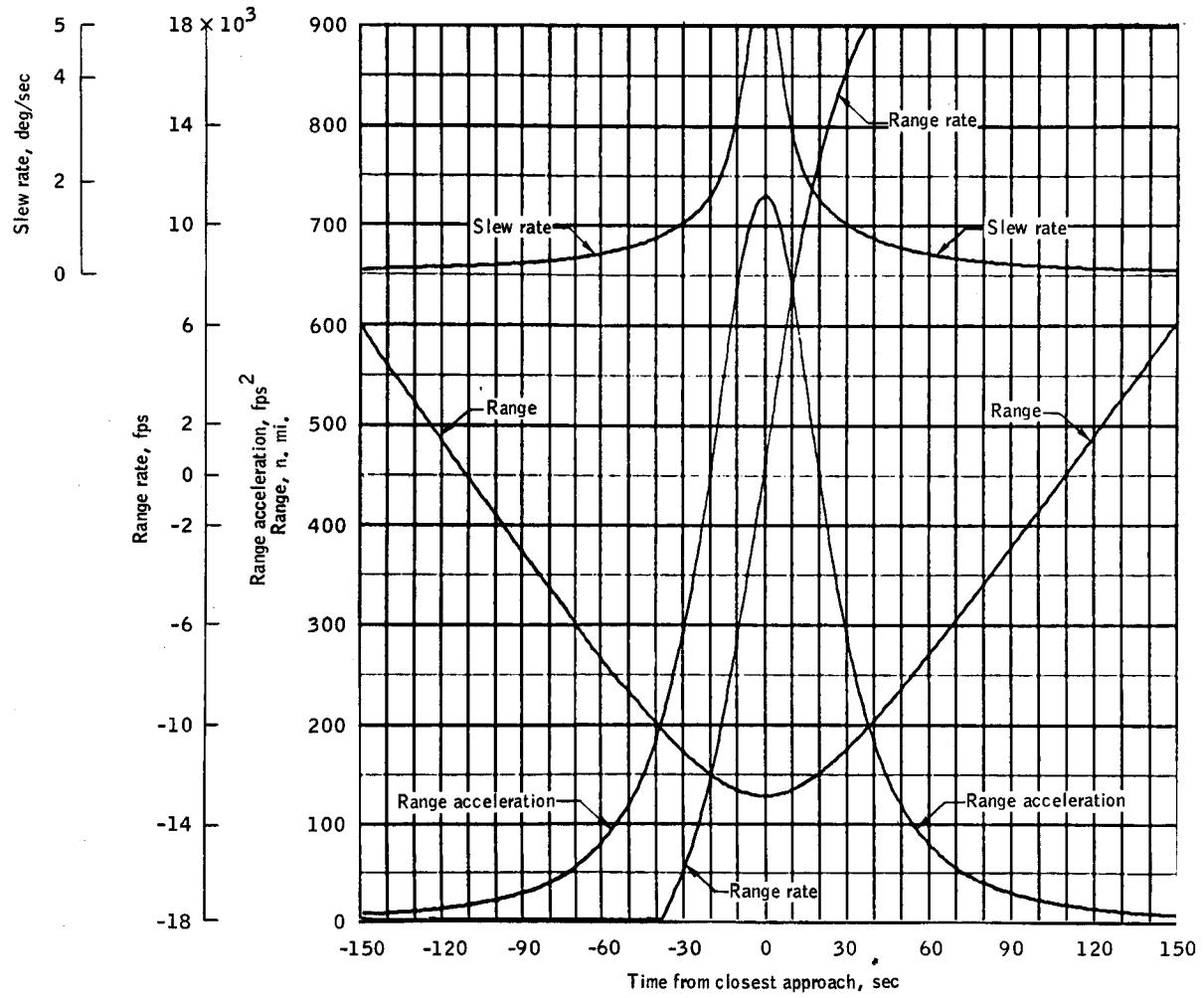
(w) Revolution 74.

Figure 1.- Continued.



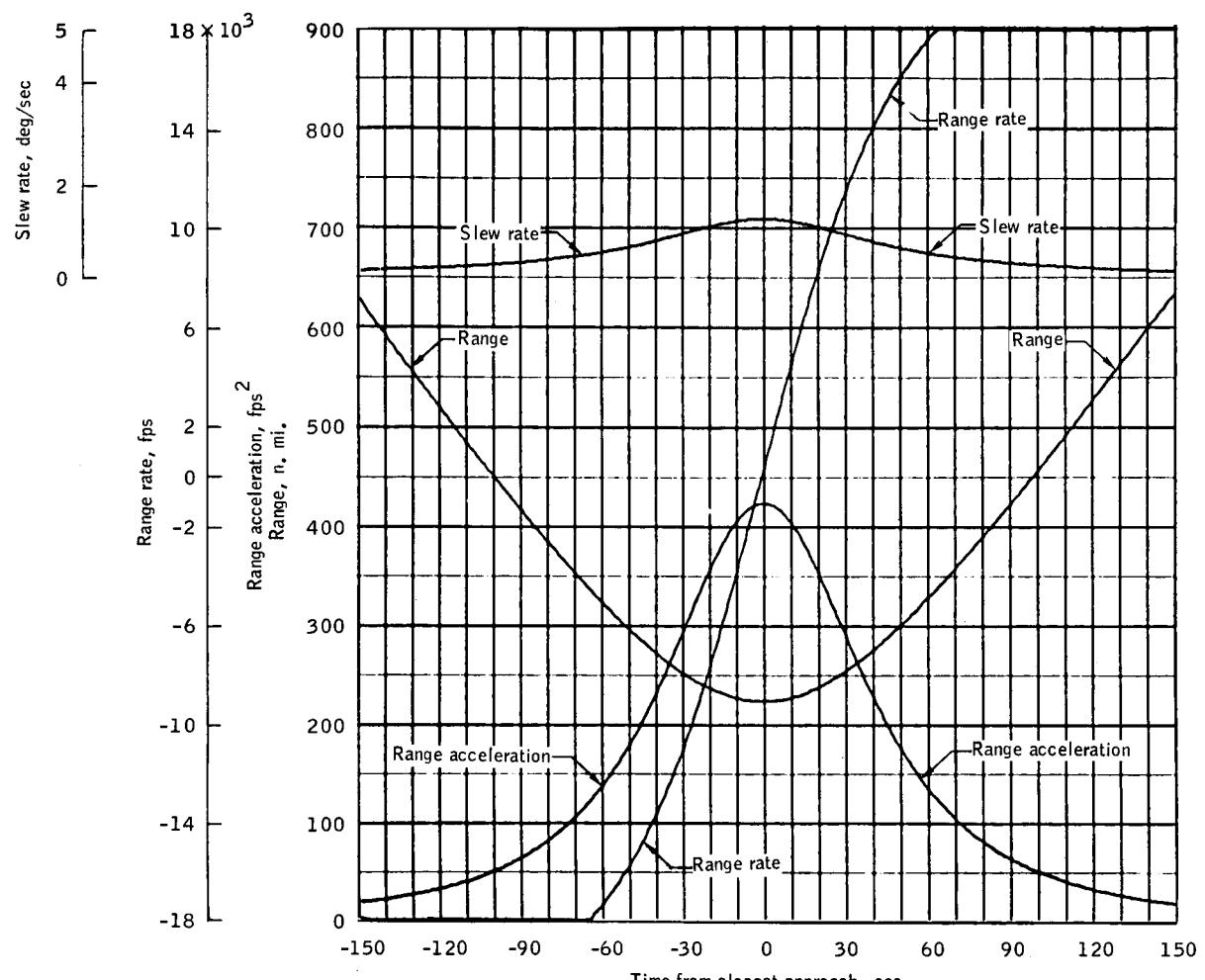
(x) Revolution 75.

Figure 1.- Continued.



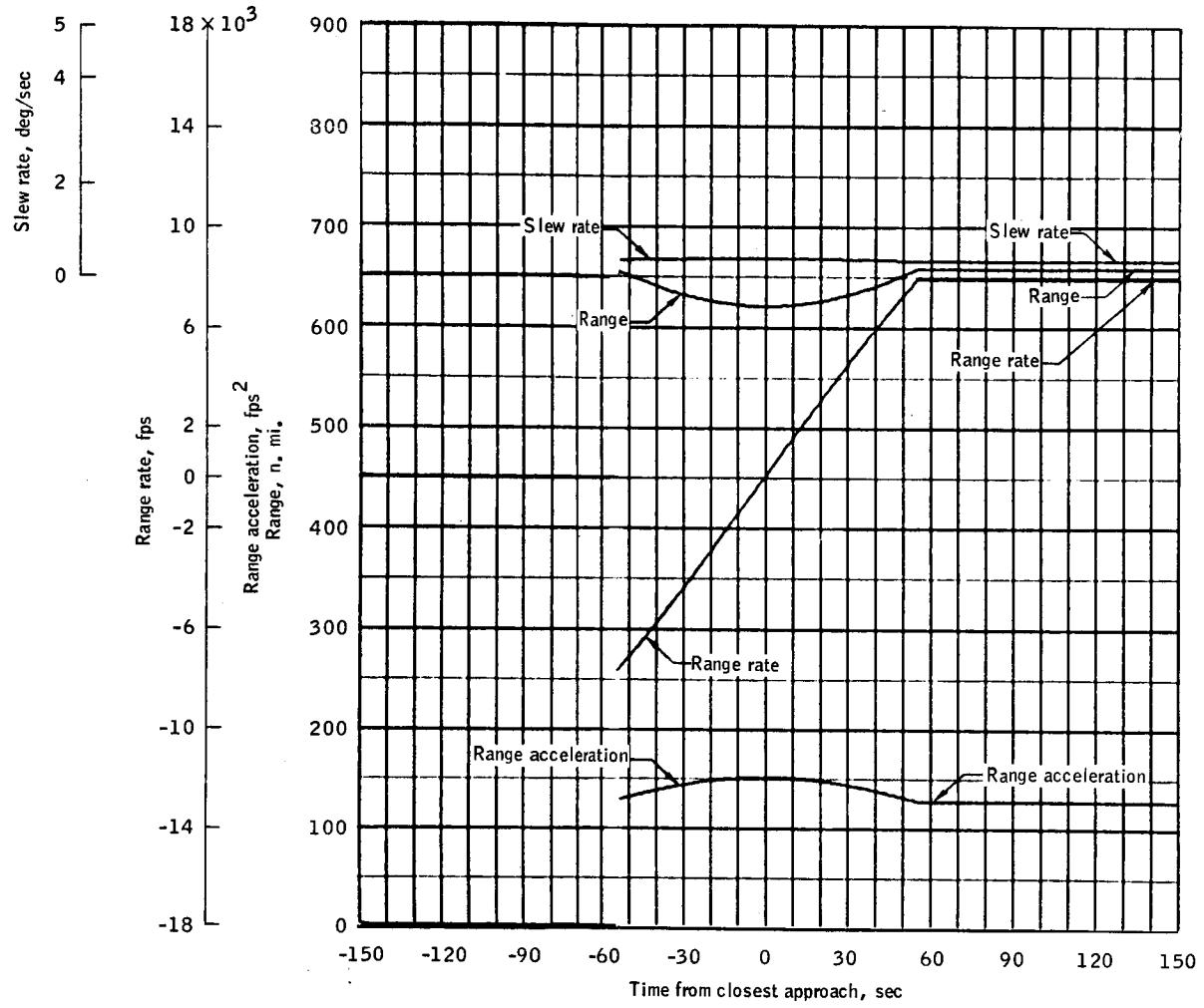
(y) Revolution 76.

Figure 1.- Continued.



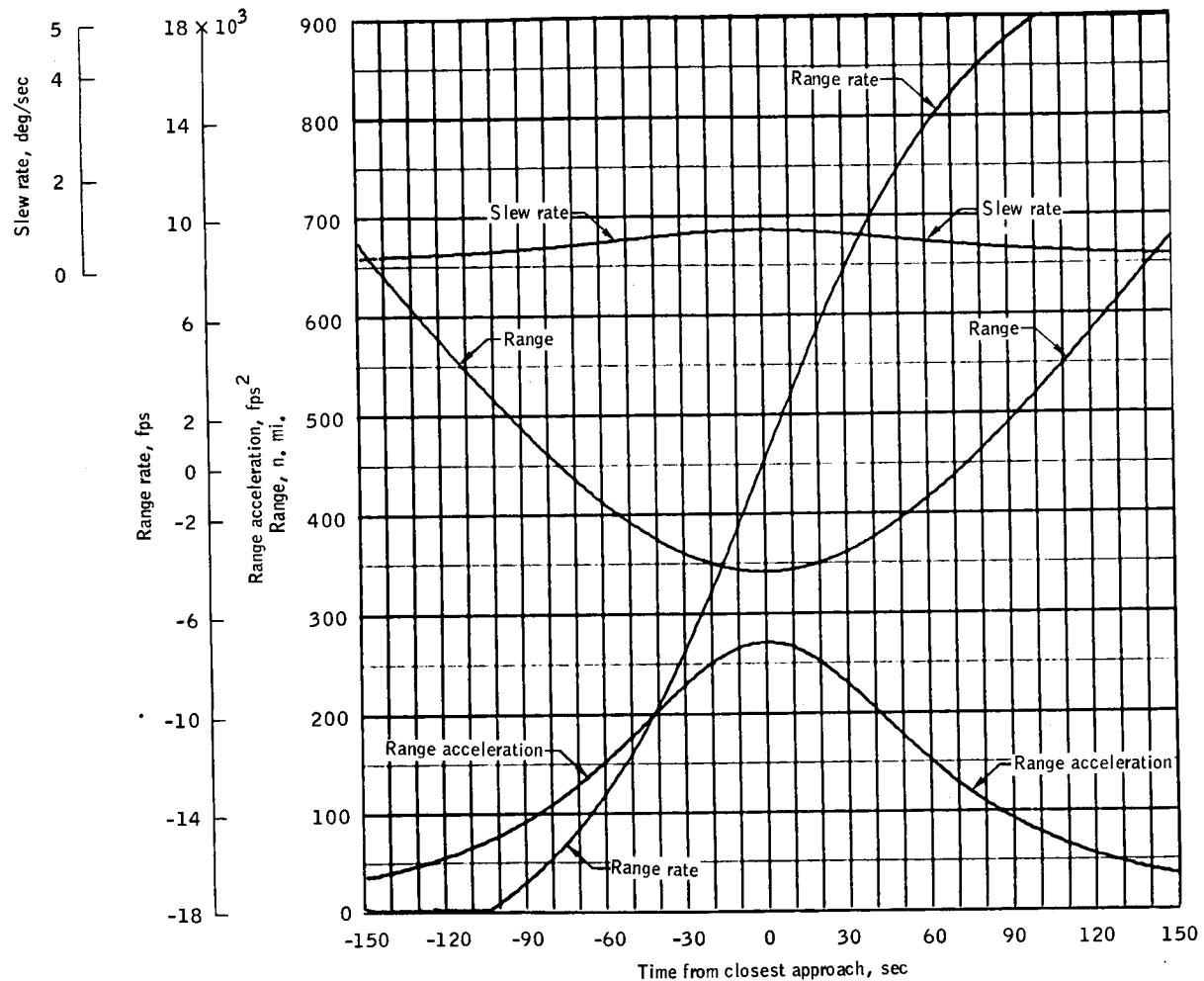
(z) Revolution 77.

Figure 1.- Continued.



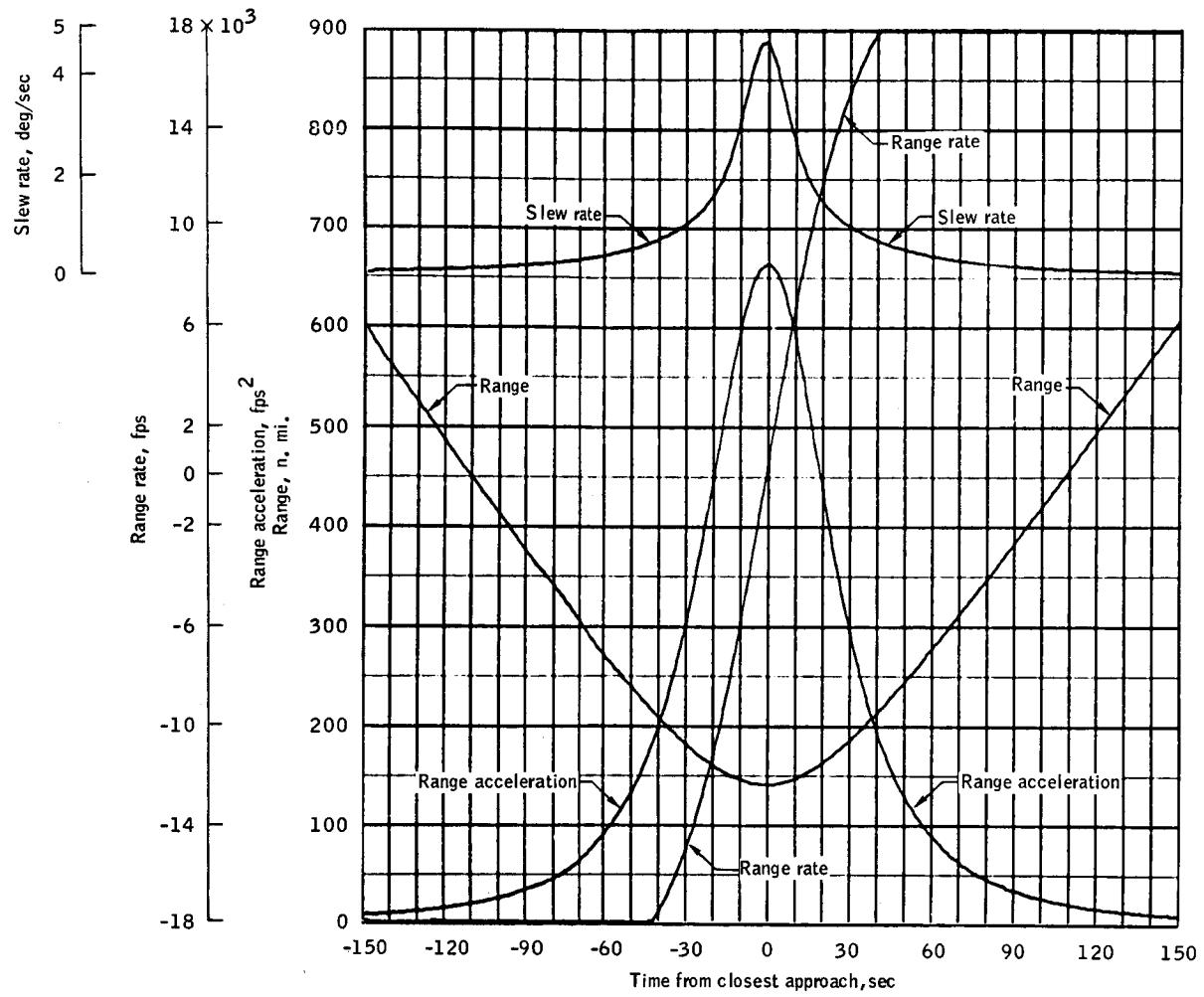
(aa) Revolution 78.

Figure 1.- Continued.



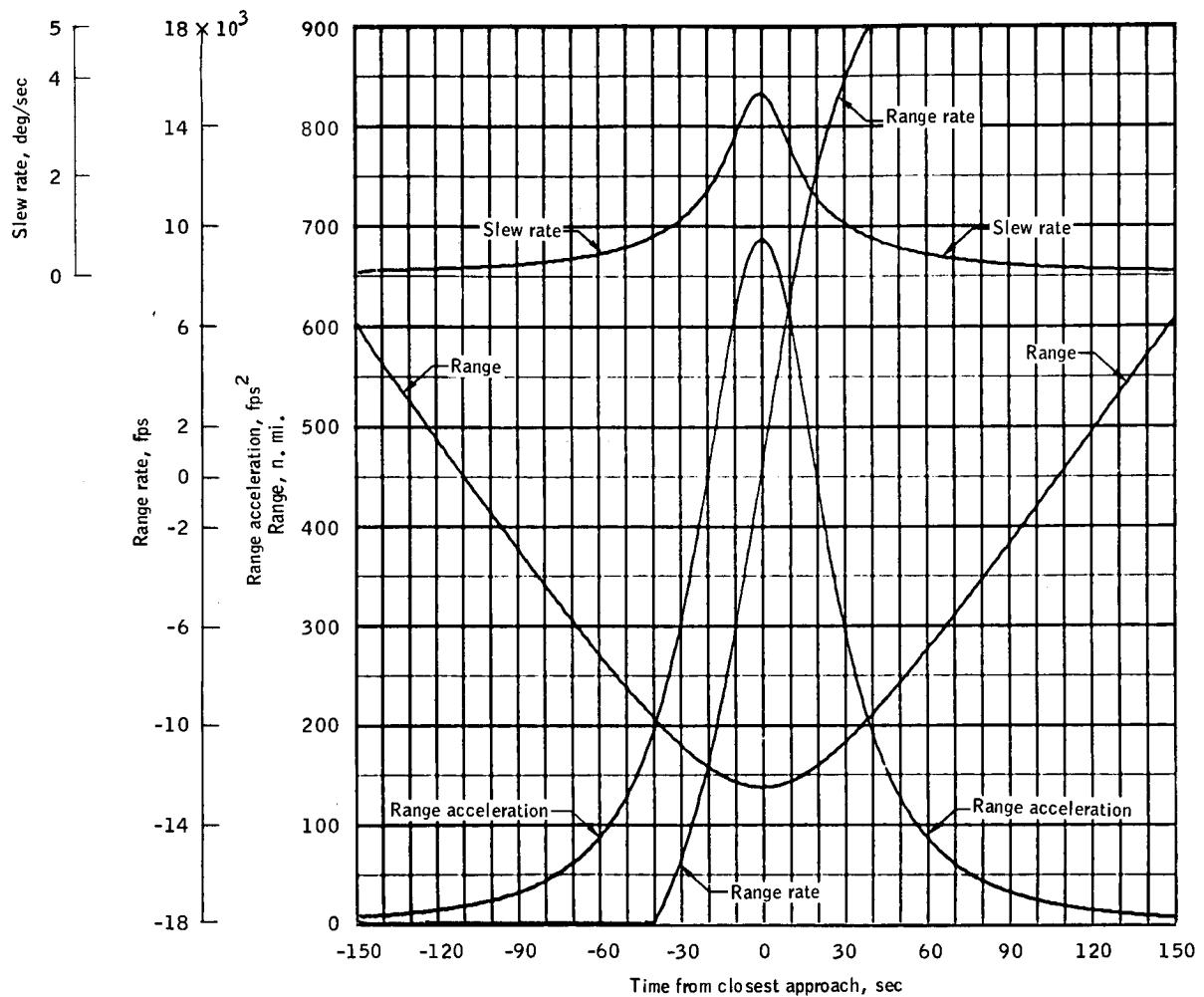
(bb) Revolution 89.

Figure 1.- Continued.



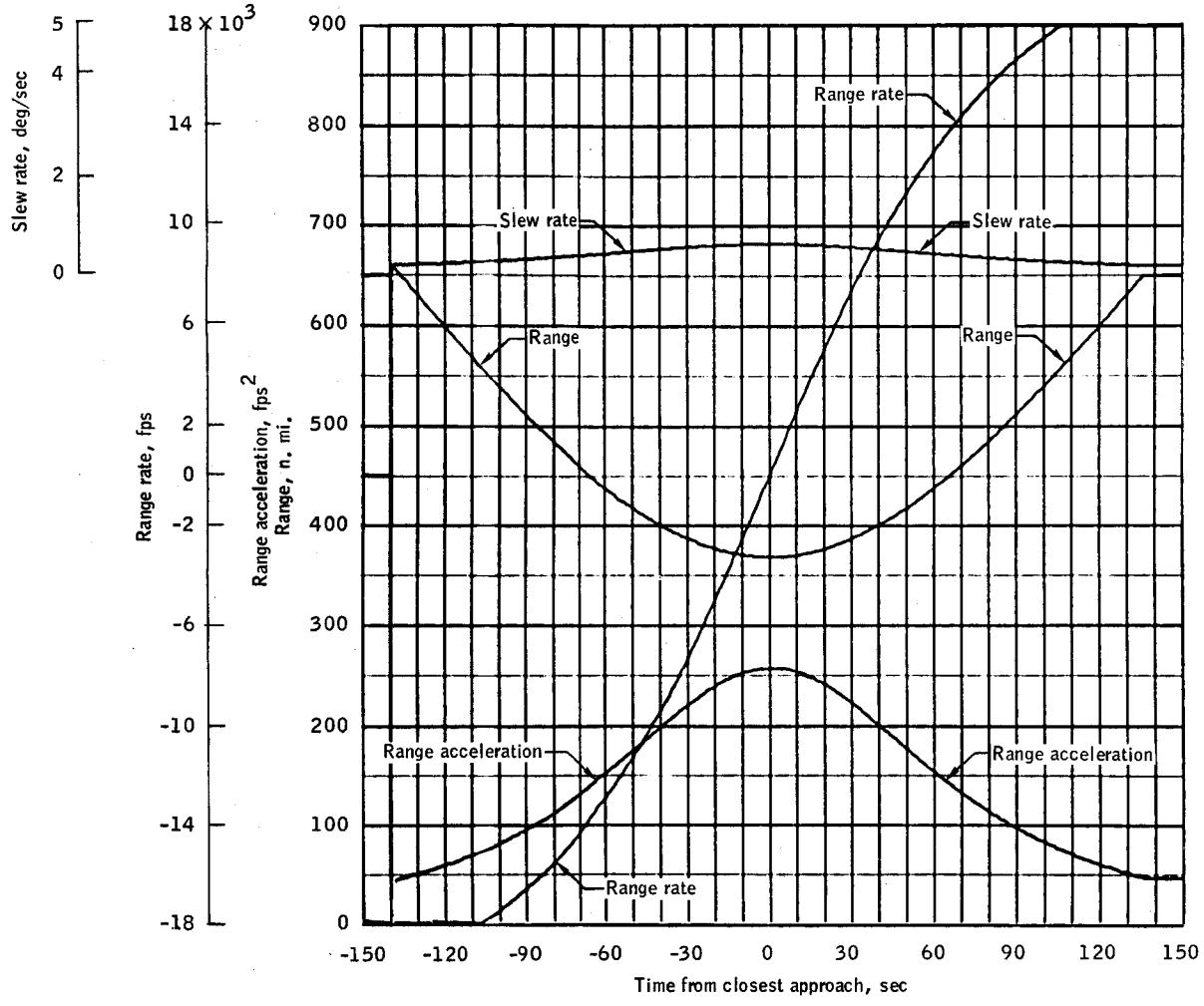
(cc) Revolution 90.

Figure 1.- Continued.



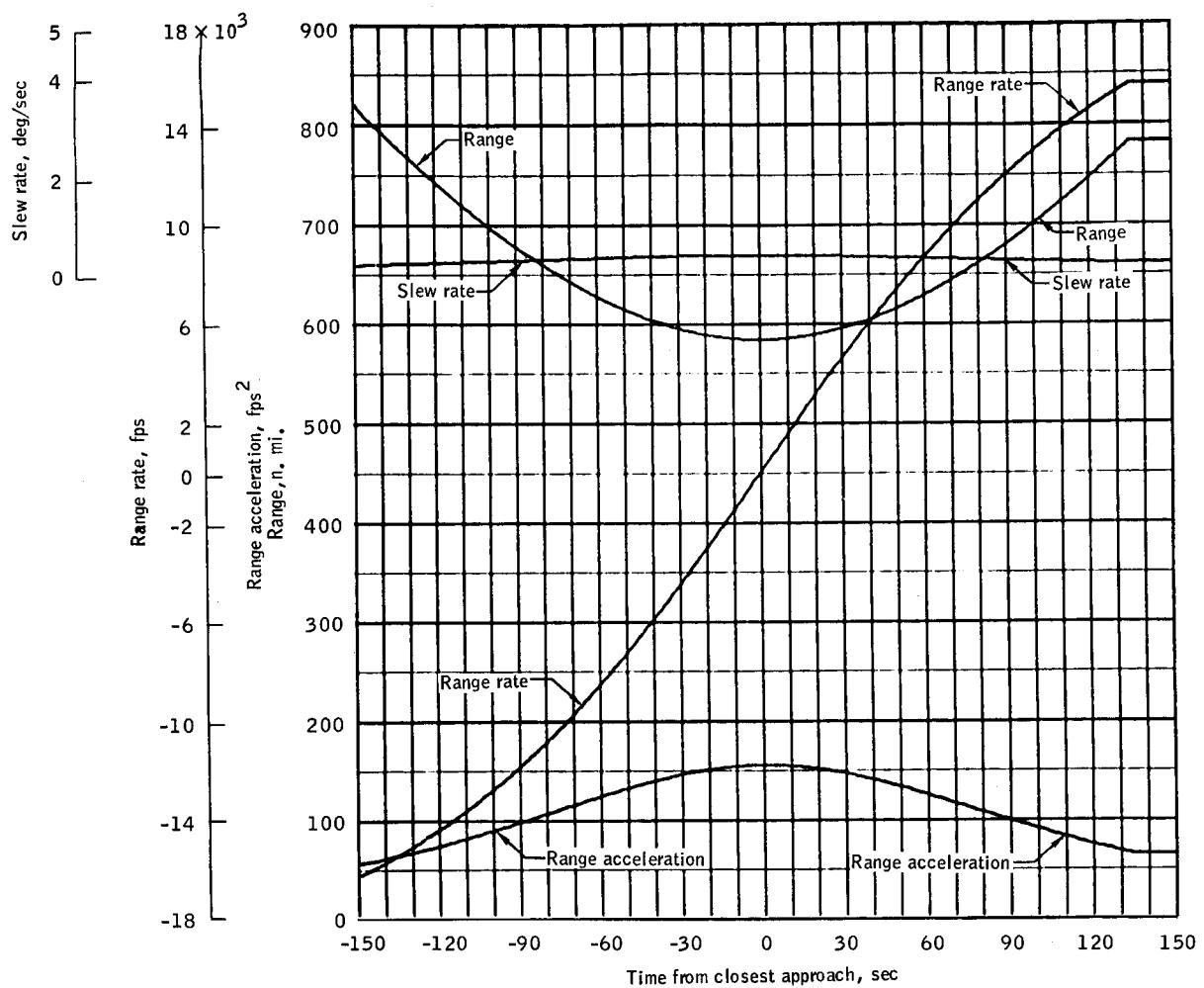
(dd) Revolution 91.

Figure 1.- Continued.



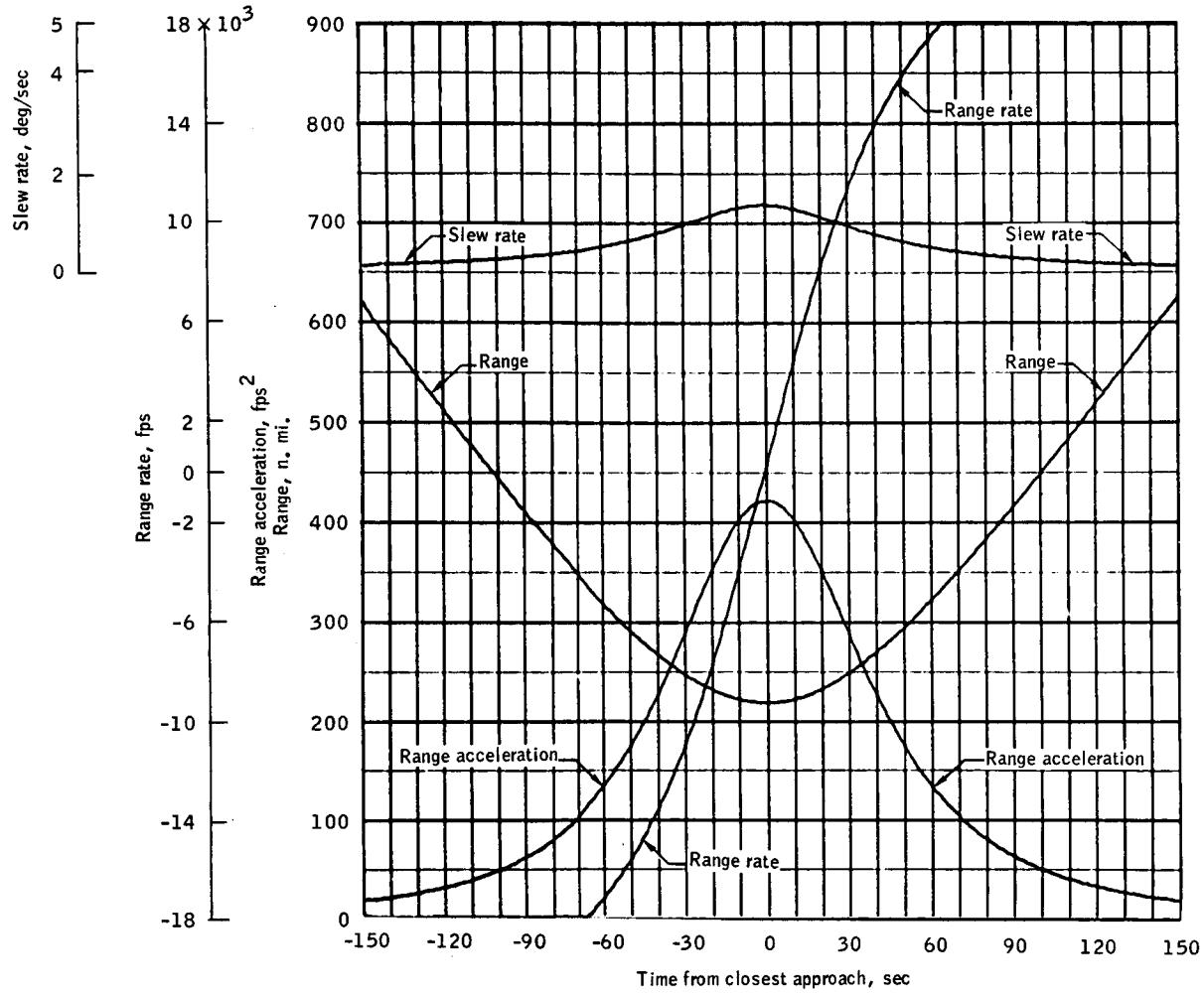
(ee) Revolution 92.

Figure 1.- Continued.



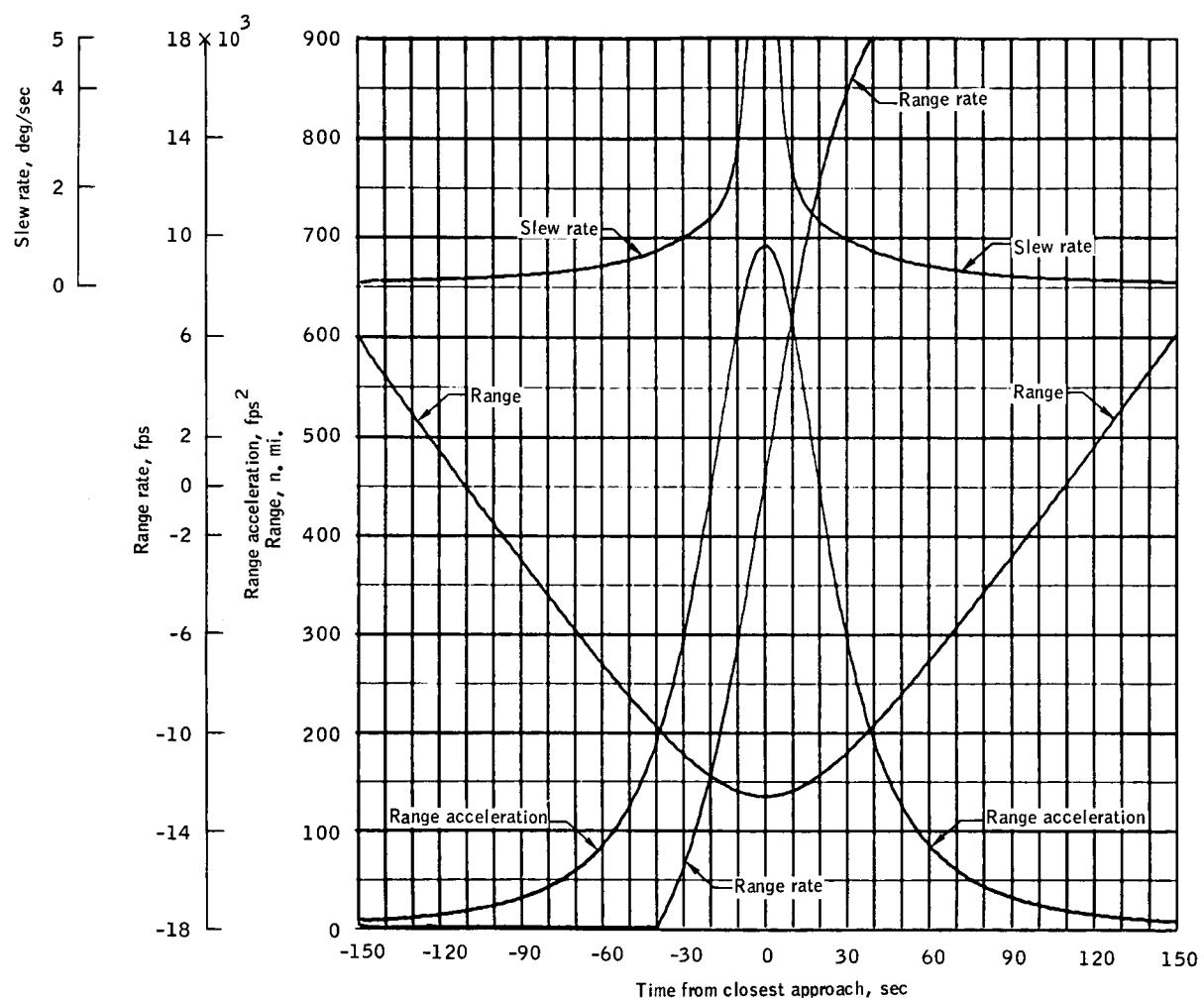
(ff) Revolution 103.

Figure 1.- Continued.



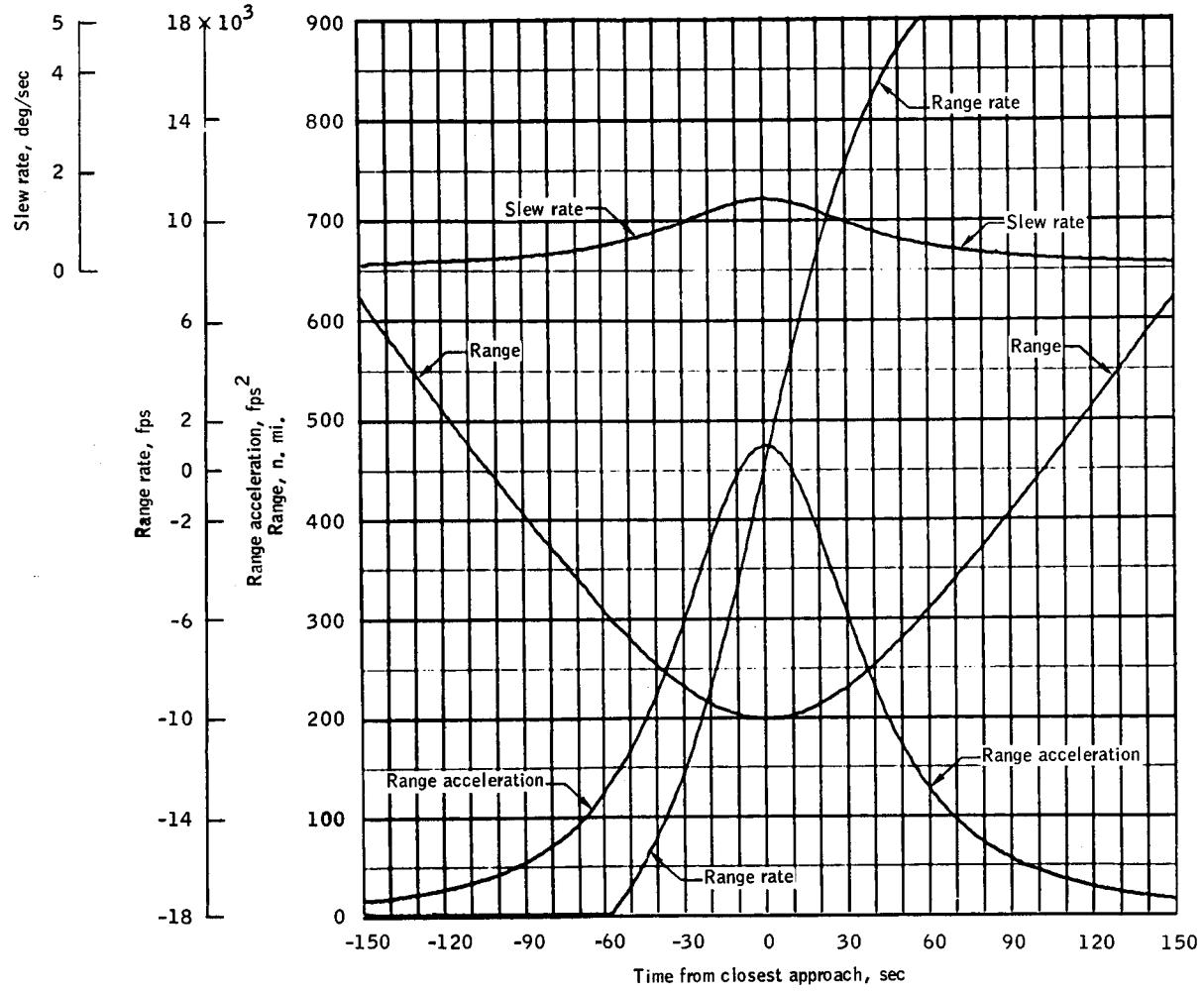
(gg) Revolution 104.

Figure 1.- Continued.



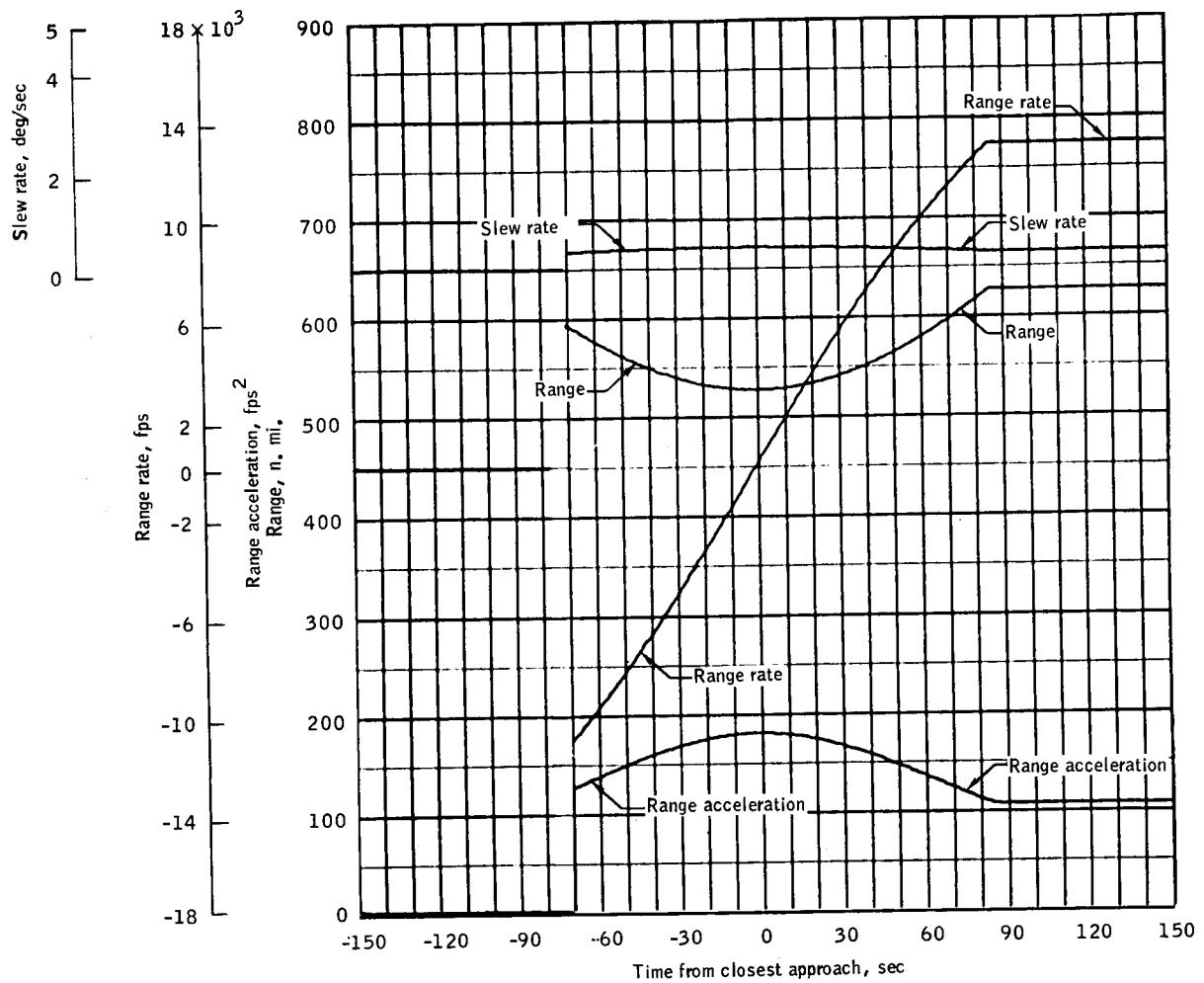
(hh) Revolution 105.

Figure 1.- Continued.



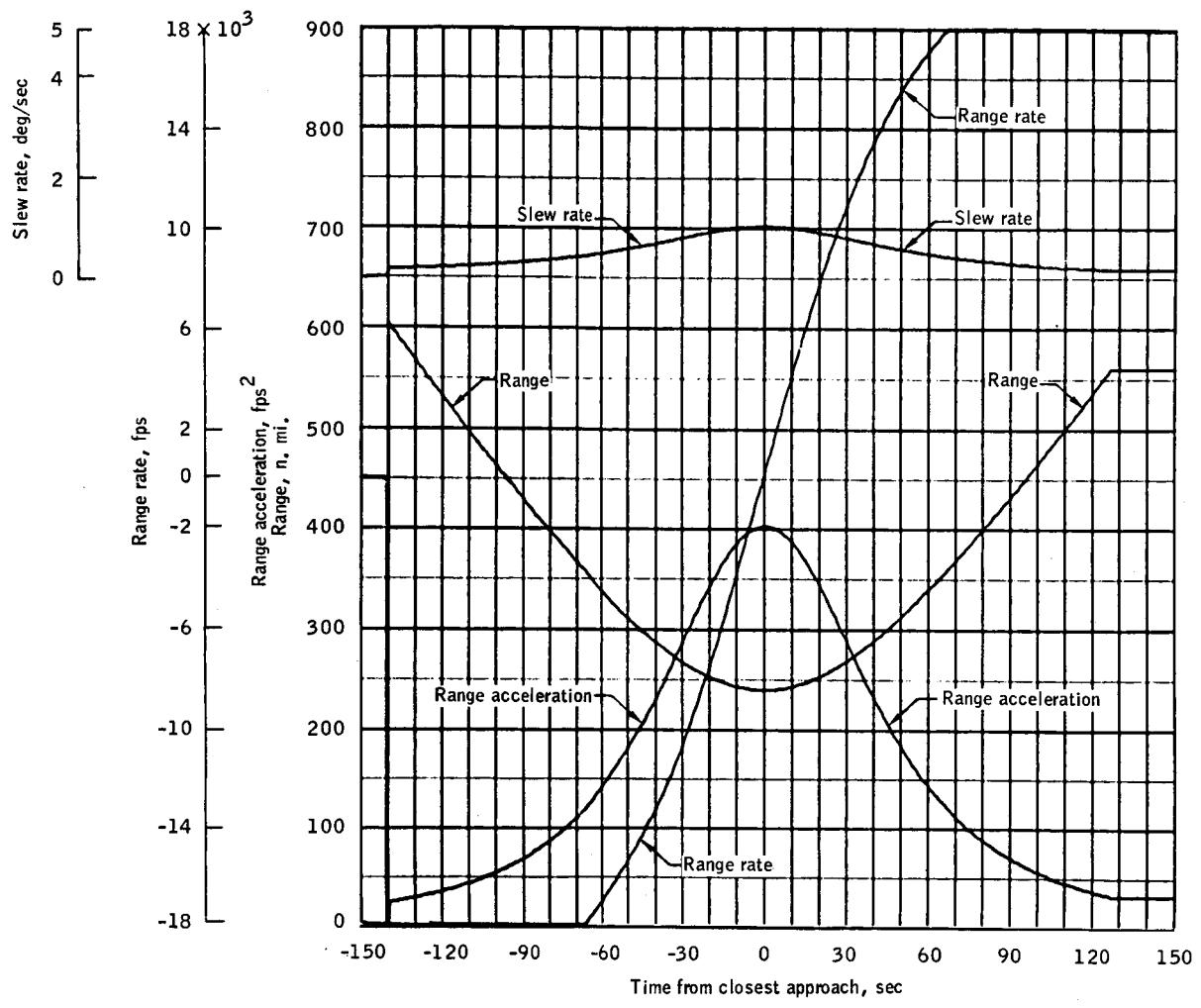
(ii) Revolution 106.

Figure 1.- Continued.



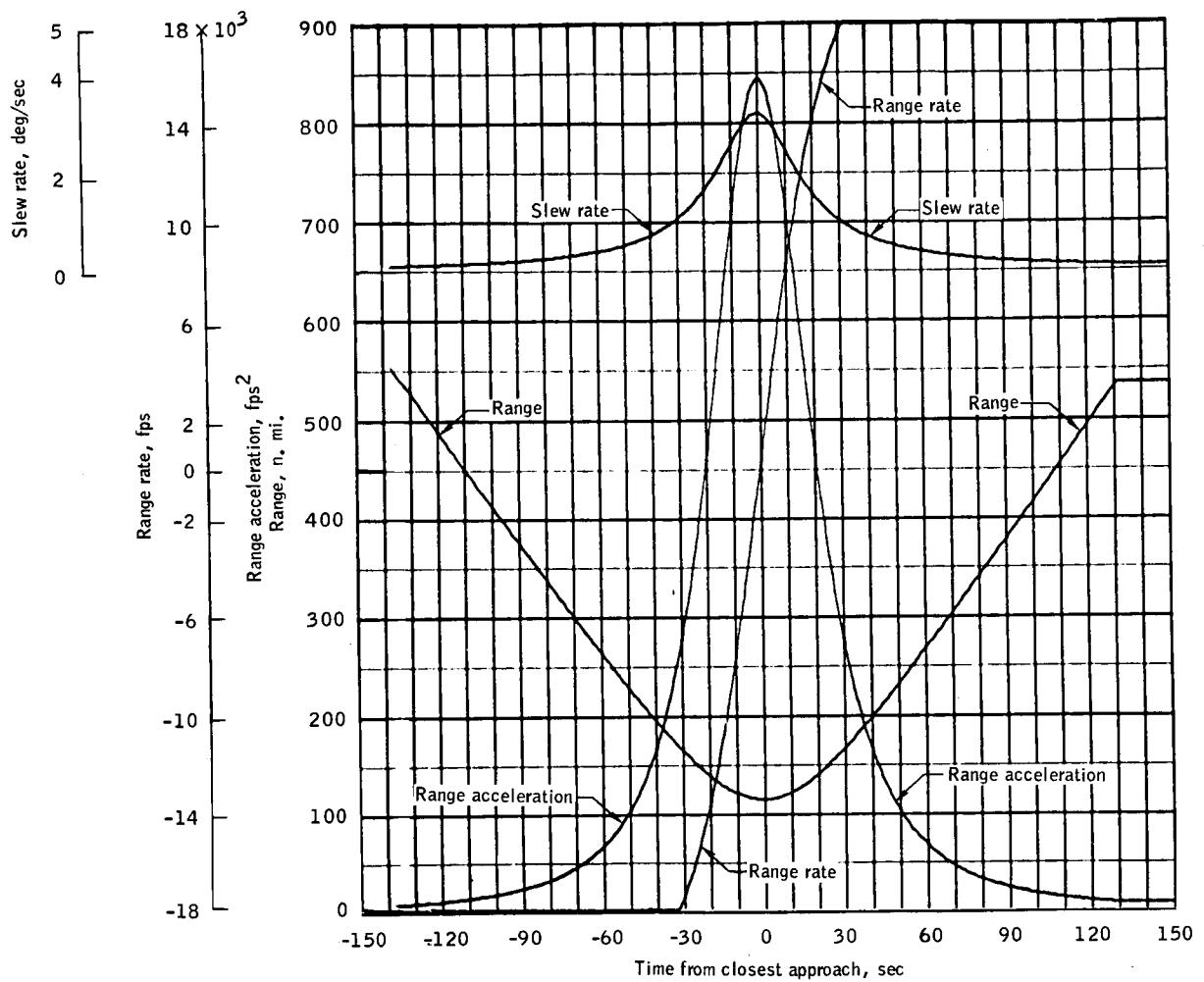
(jj) Revolution 107.

Figure 1.- Continued.



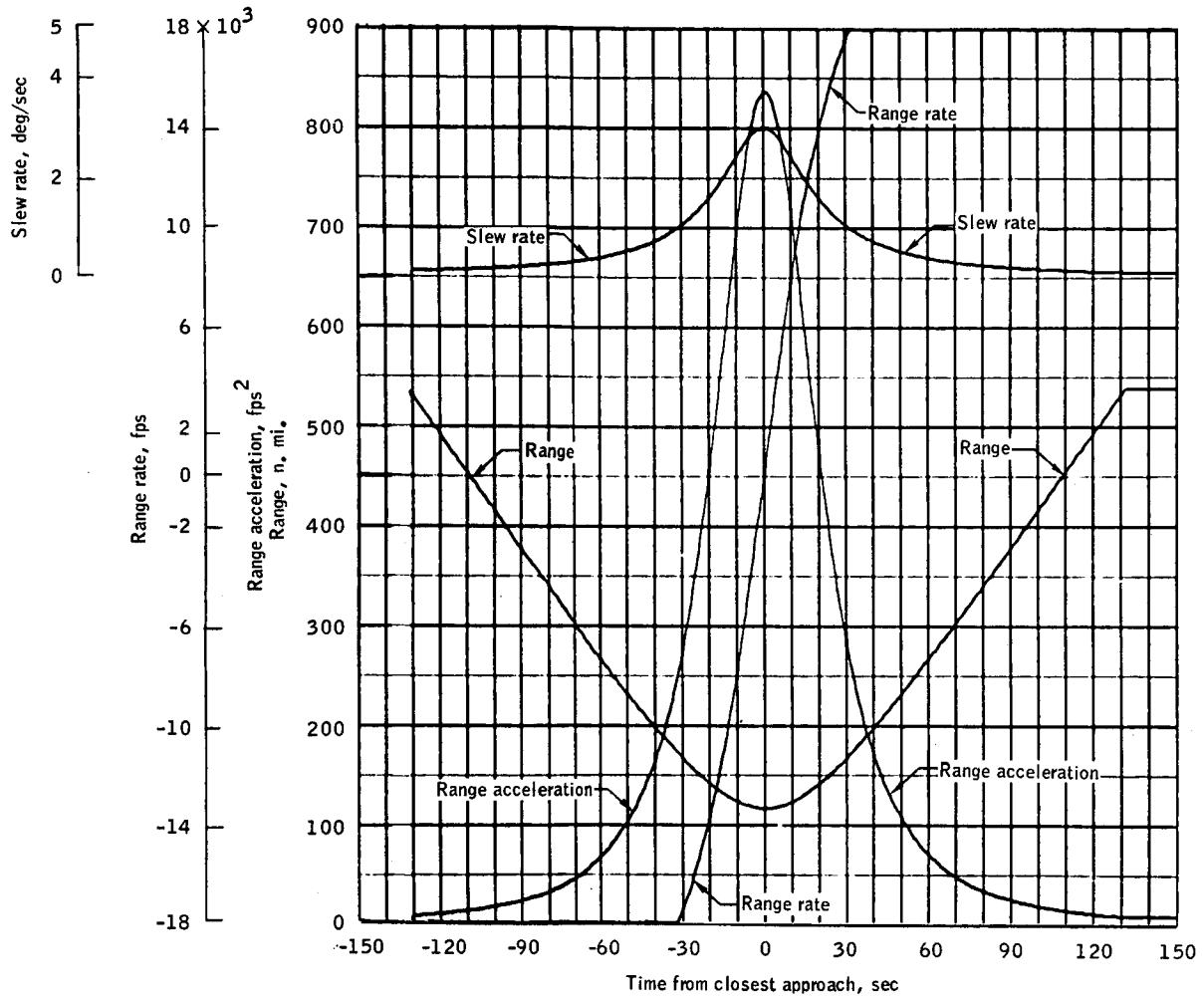
(kk) Revolution 118.

Figure 1.- Continued.



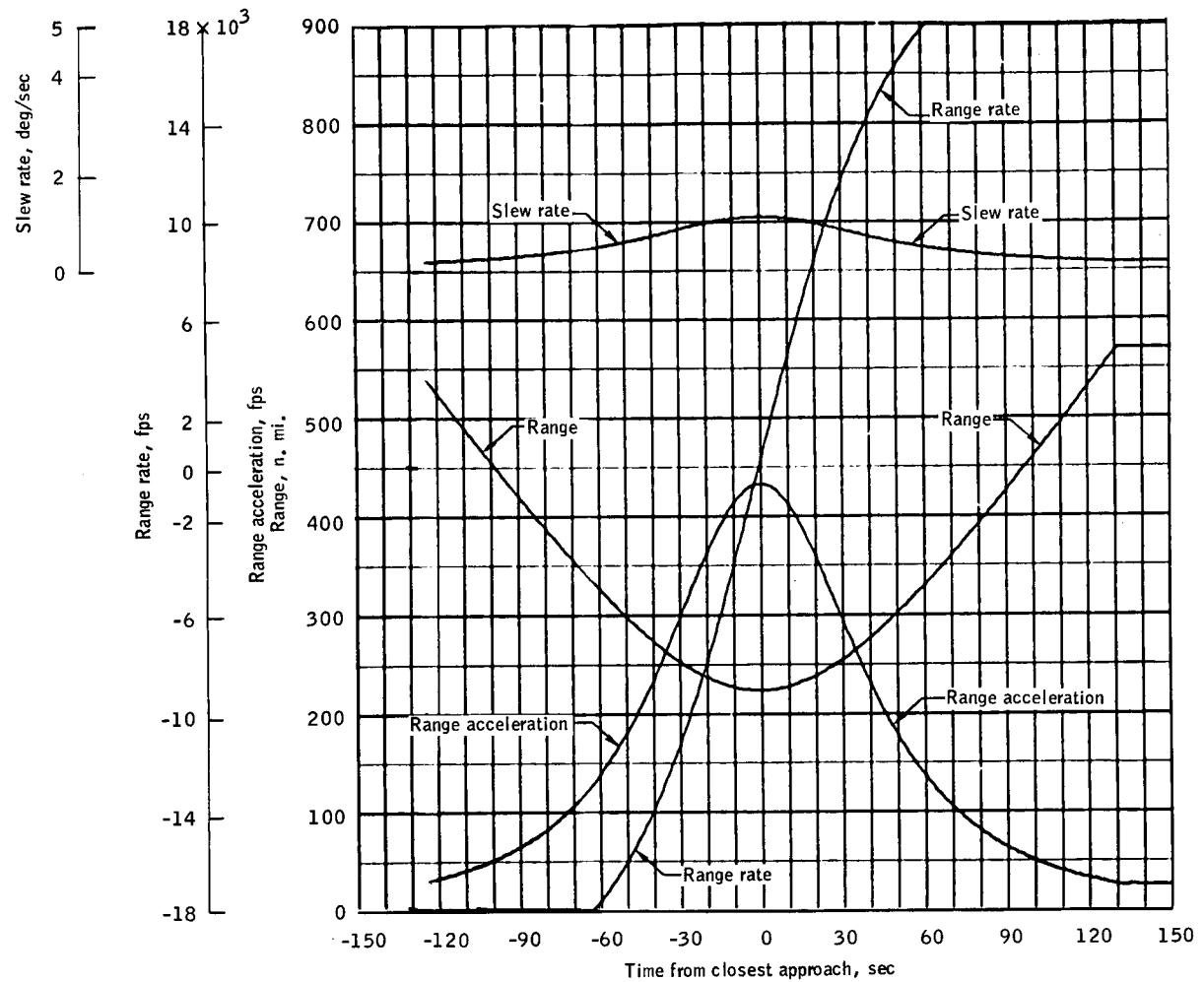
(II) Revolution 119.

Figure 1.- Continued.



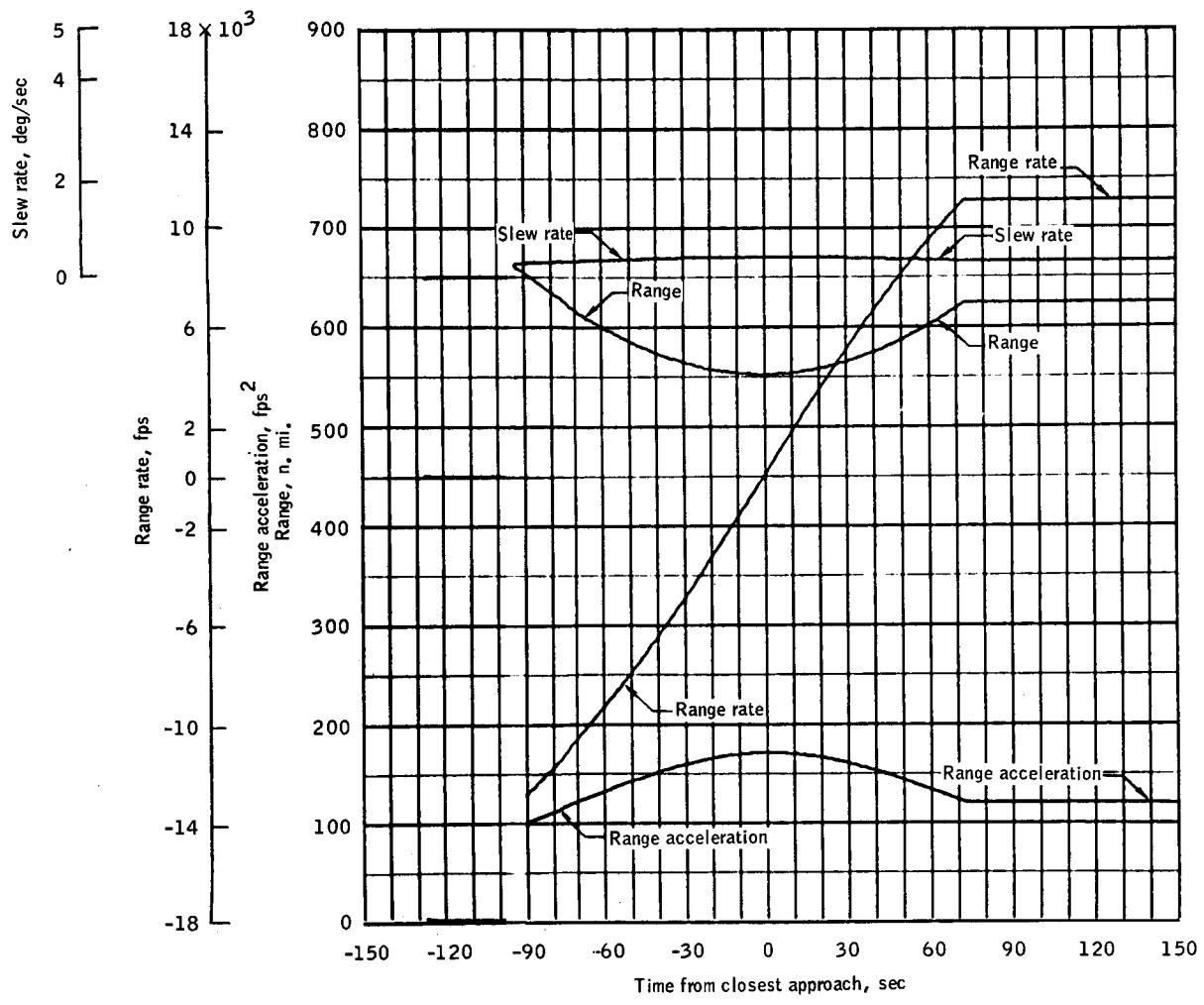
(mm) Revolution 120.

Figure 1.- Continued.



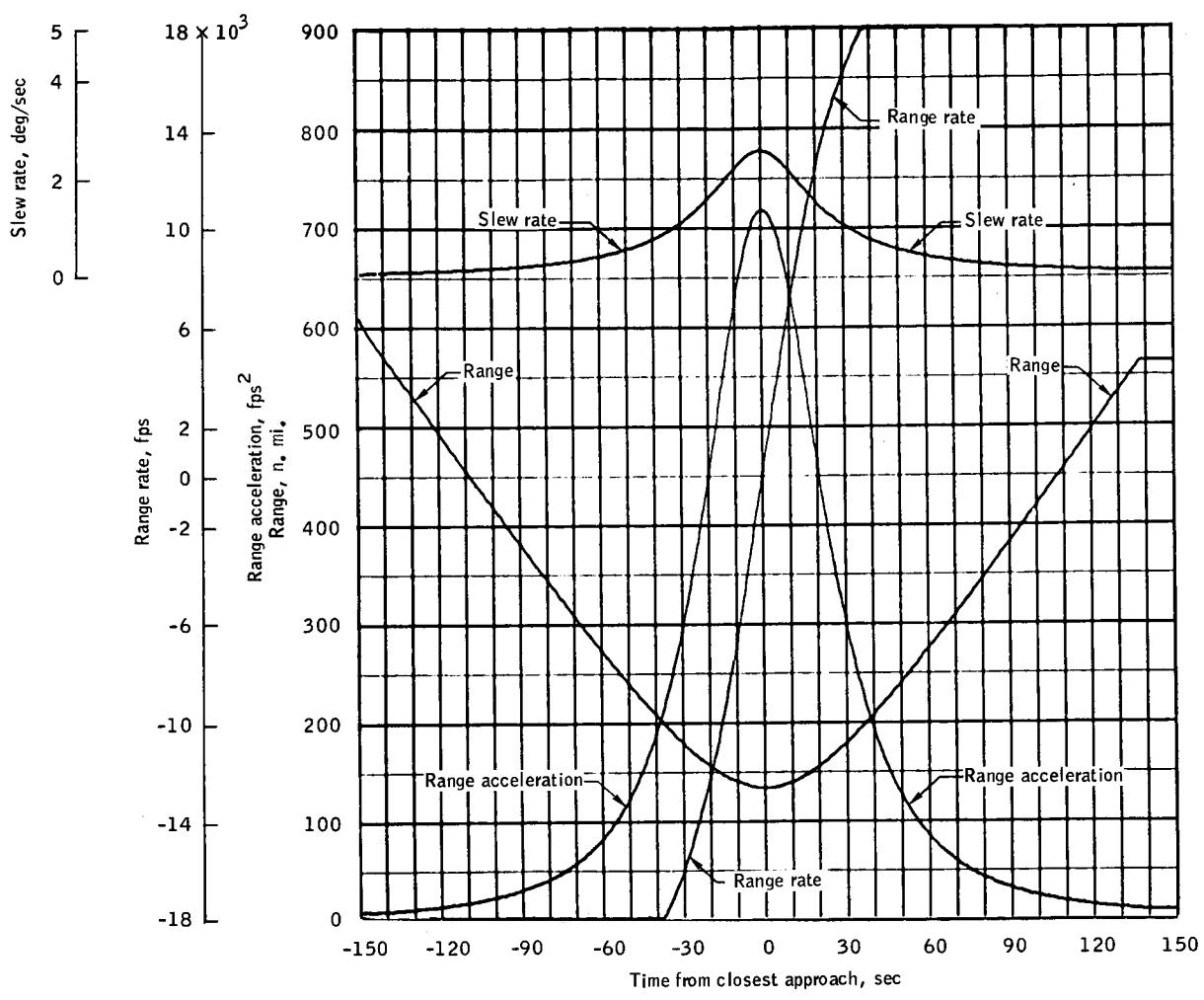
(nn) Revolution 121.

Figure 1.- Continued.



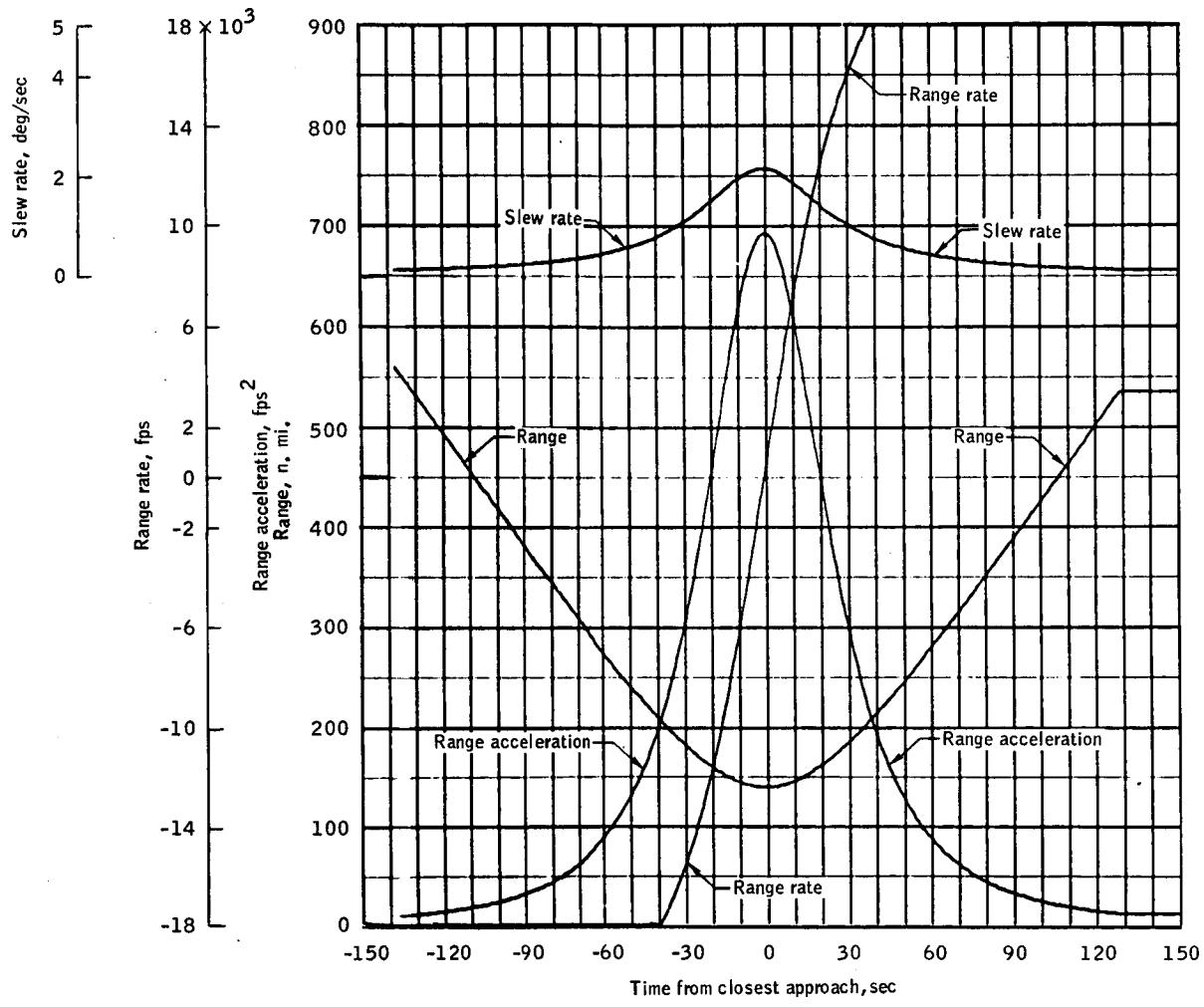
(oo) Revolution 132.

Figure 1.- Continued.



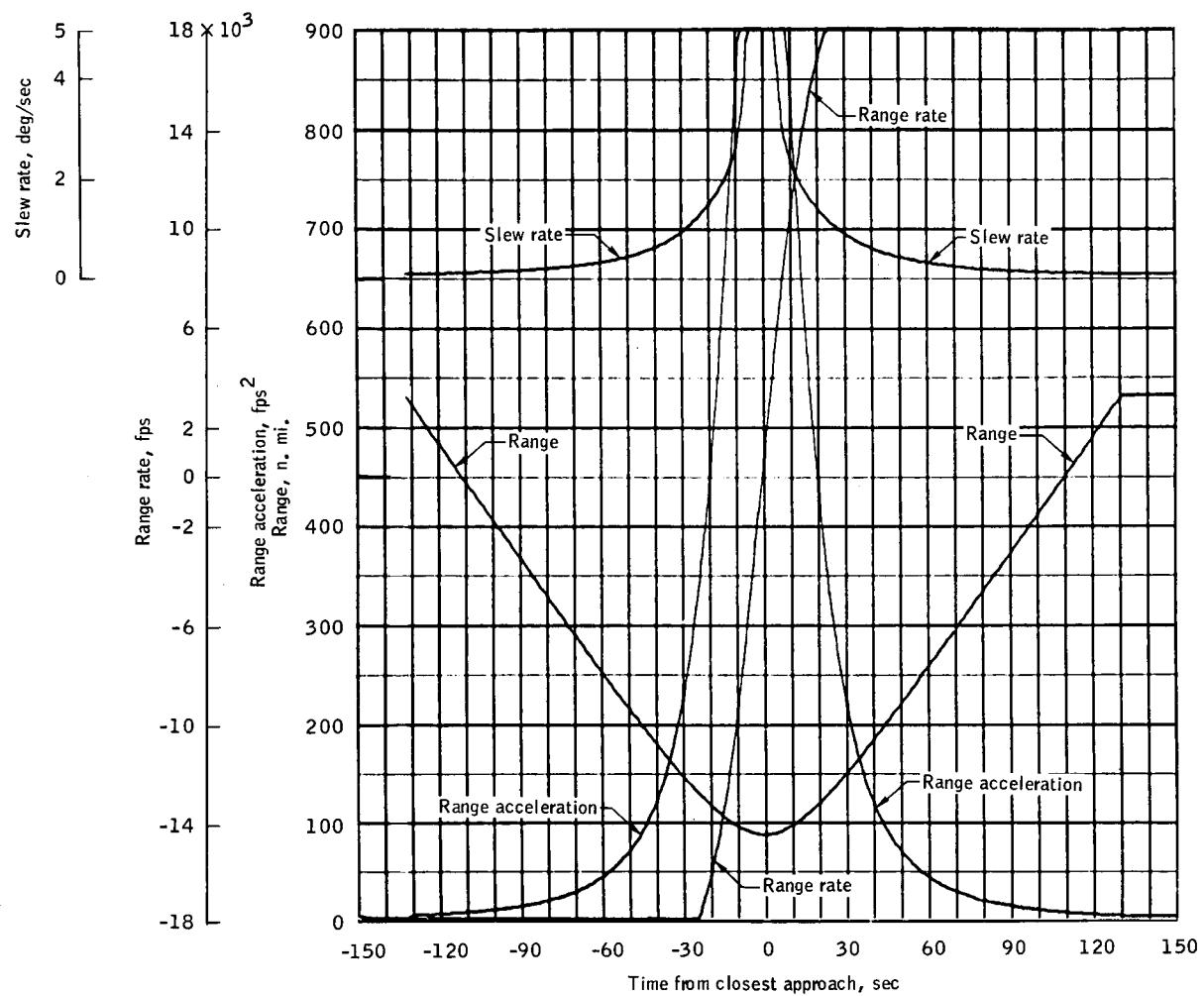
(pp) Revolution 133.

Figure 1.- Continued.



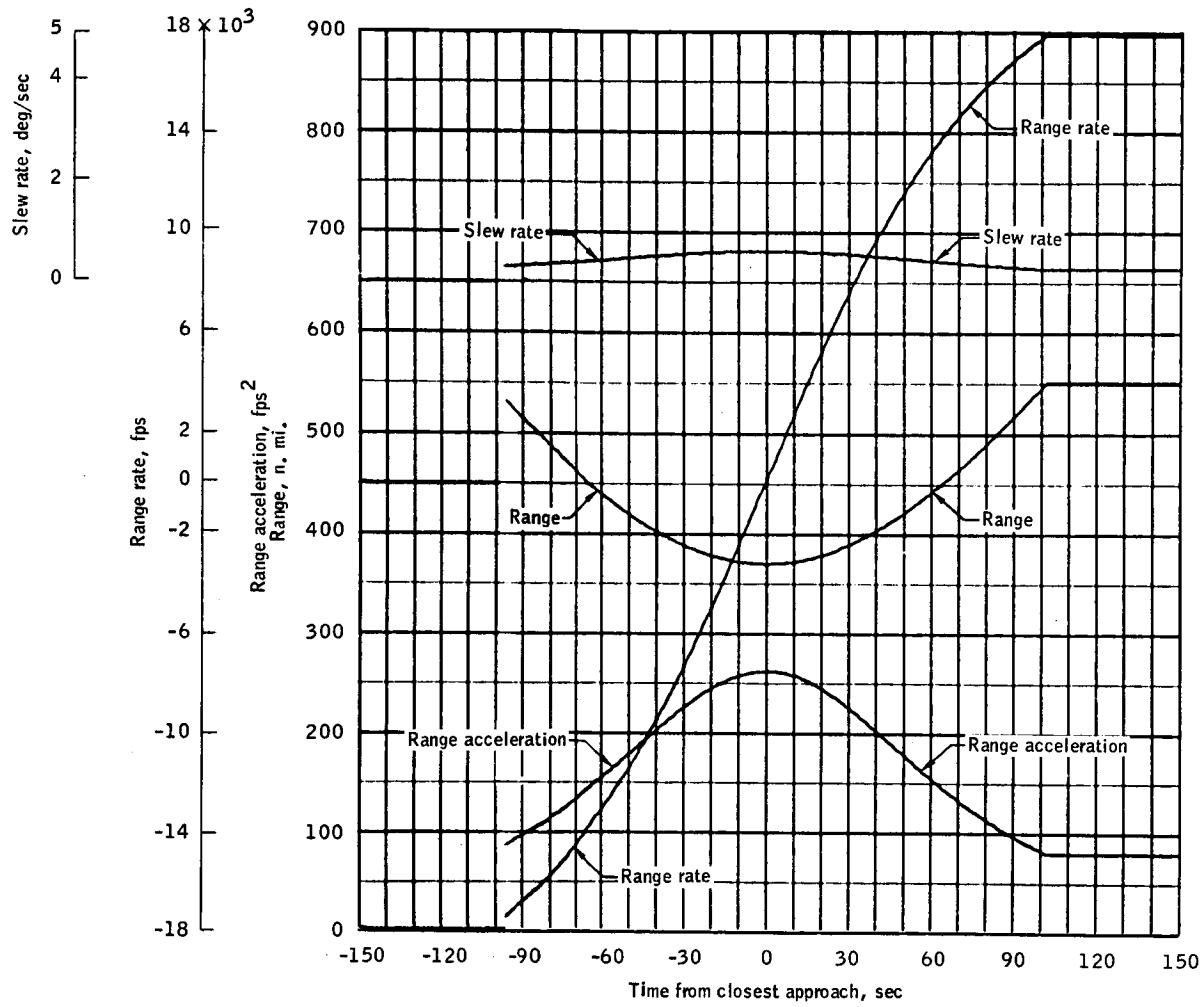
(qq) Revolution 134.

Figure 1.- Continued.



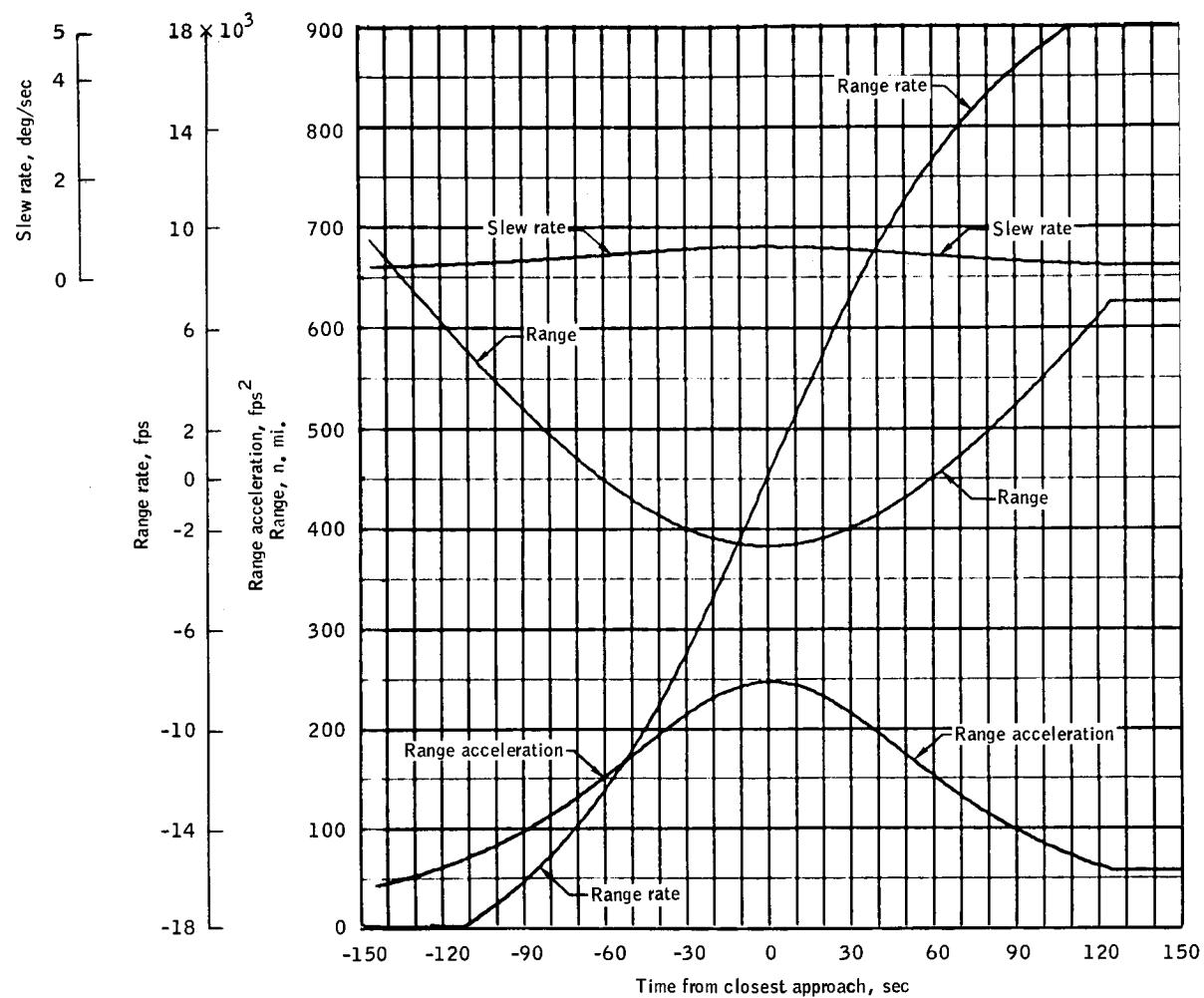
(rr) Revolution 135.

Figure 1.- Continued.



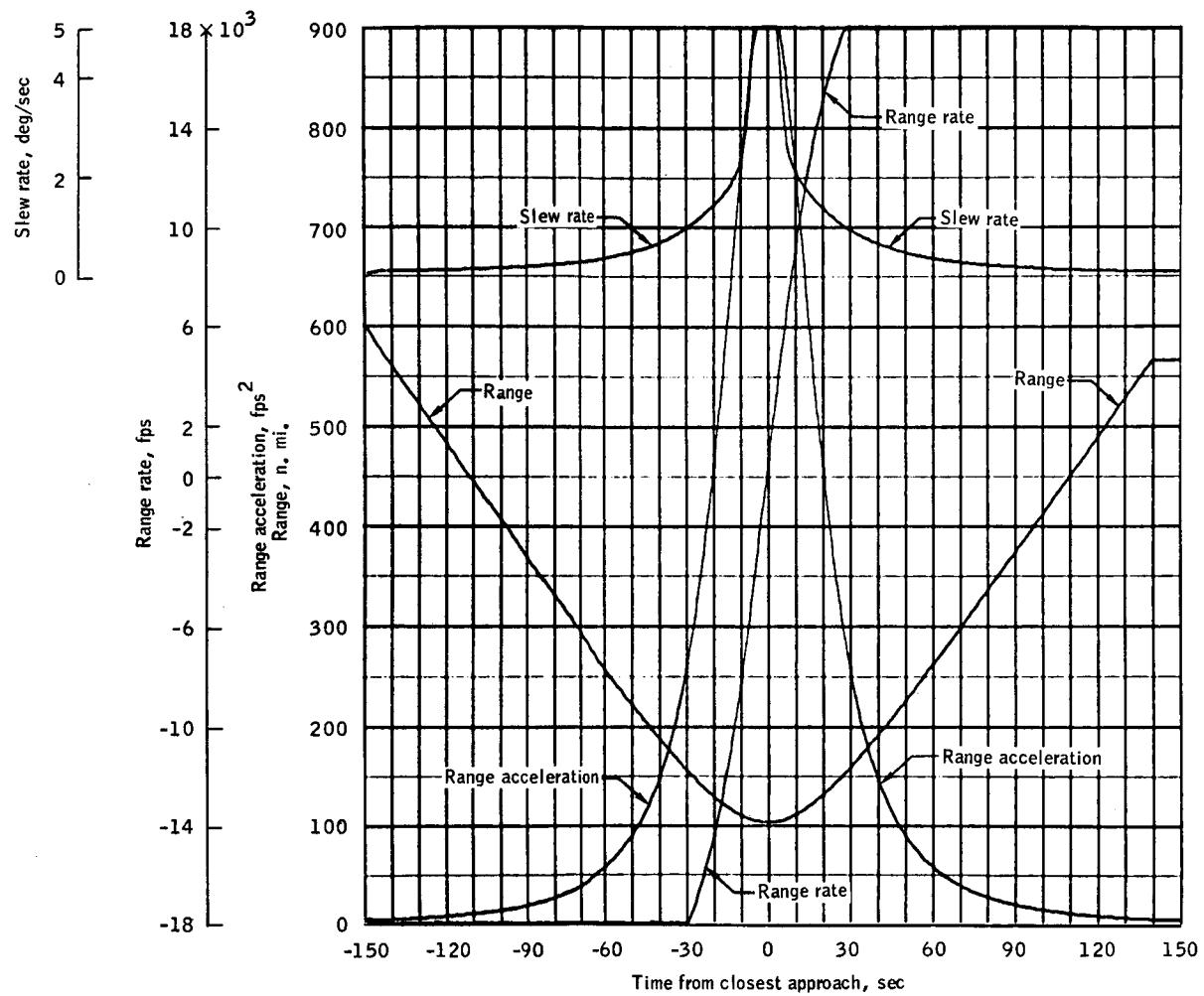
(ss) Revolution 136.

Figure 1.- Continued.



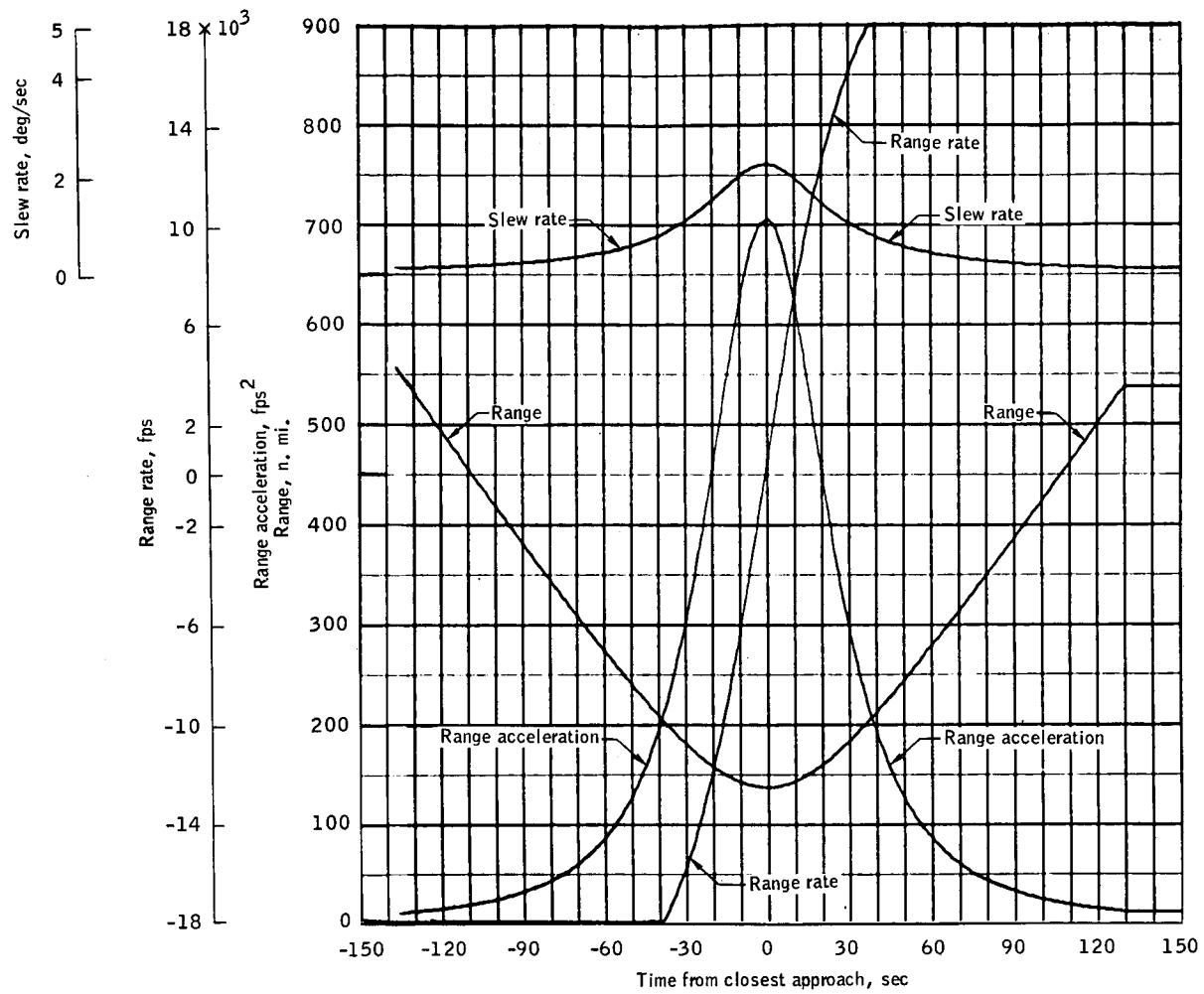
(tt) Revolution 147.

Figure 1.- Continued.



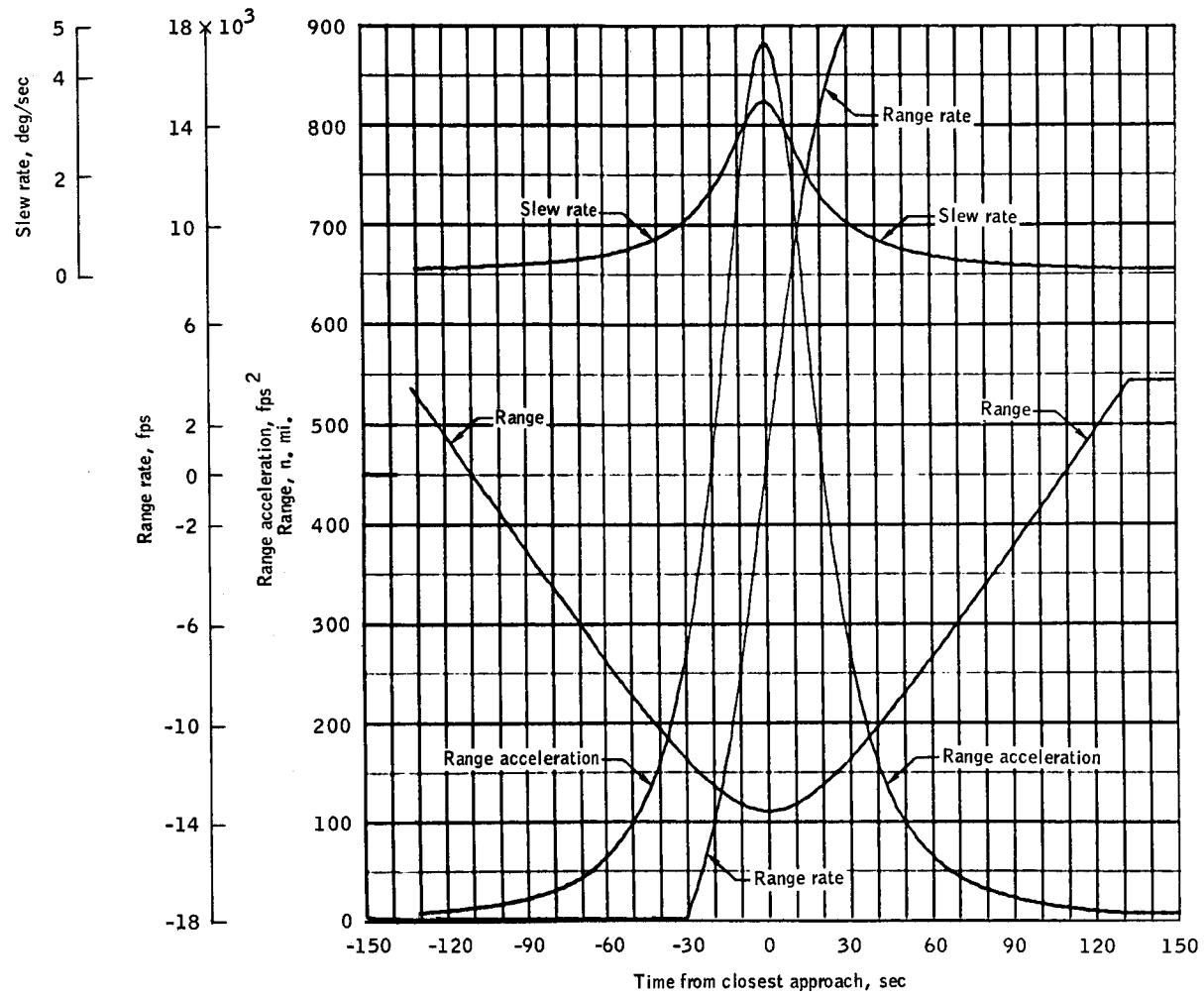
(uu) Revolution 148.

Figure 1.- Continued.



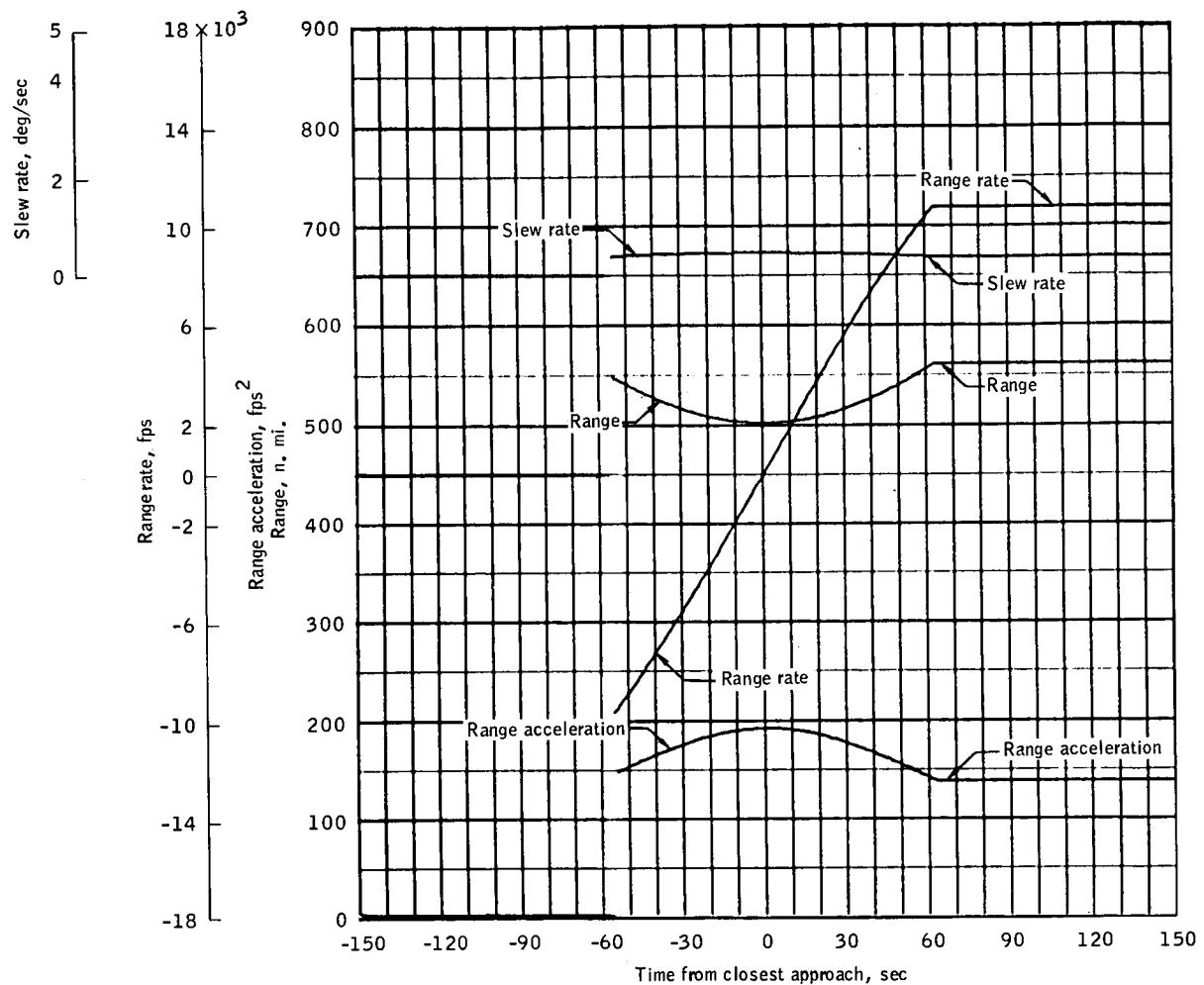
(vv) Revolution 149.

Figure 1.- Continued.



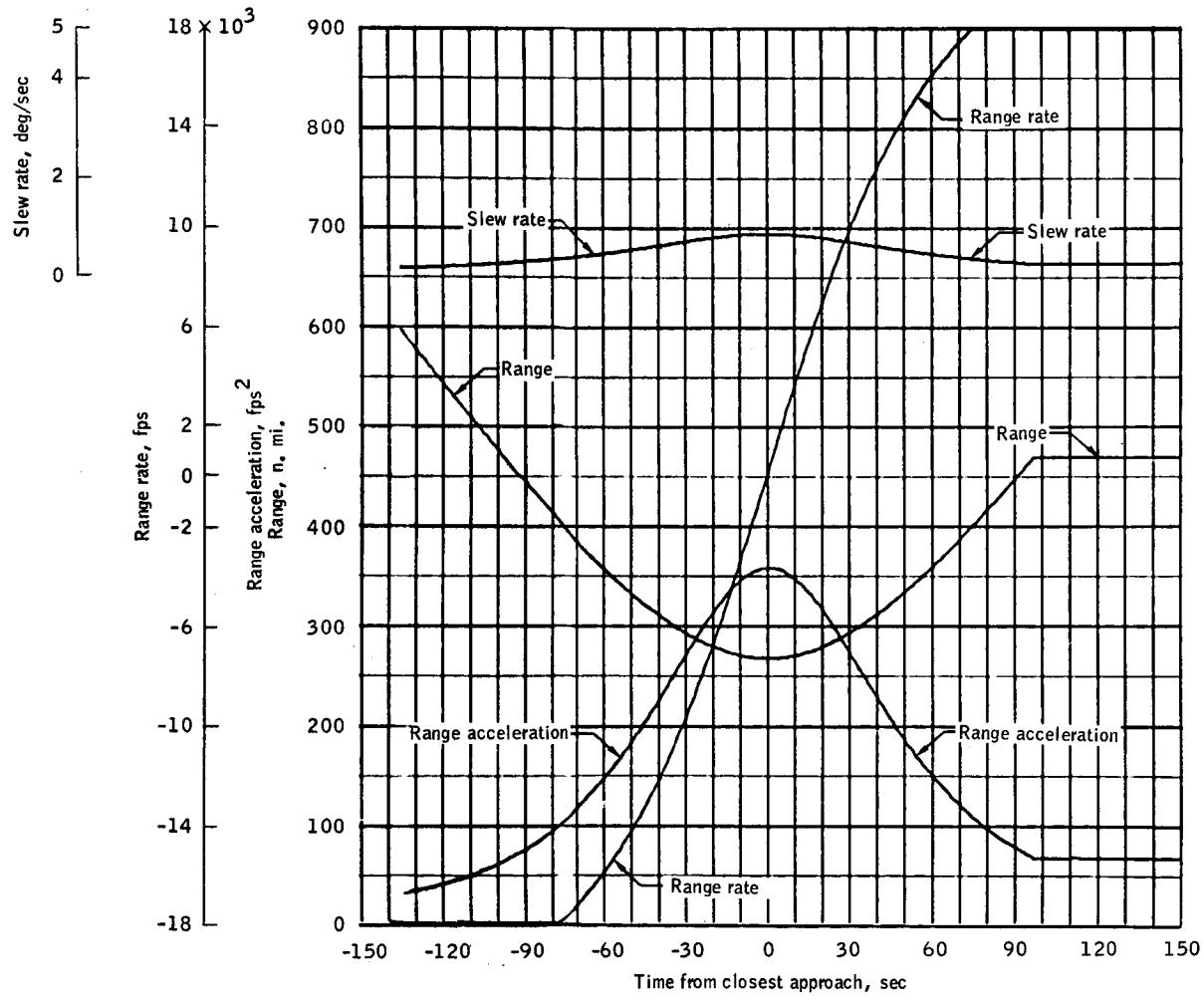
(ww) Revolution 150.

Figure 1.- Continued.



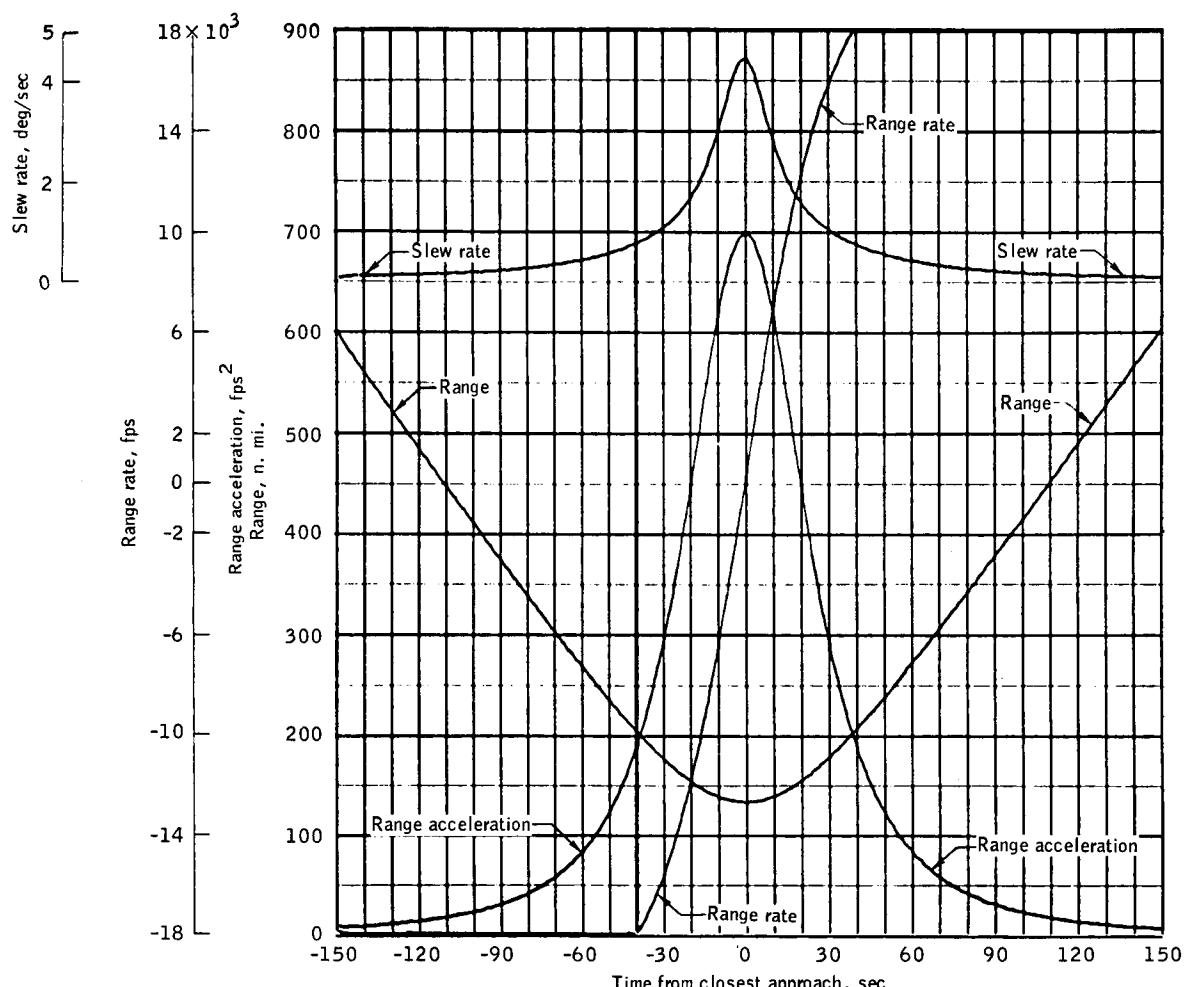
(xx) Revolution 151.

Figure 1.- Continued.



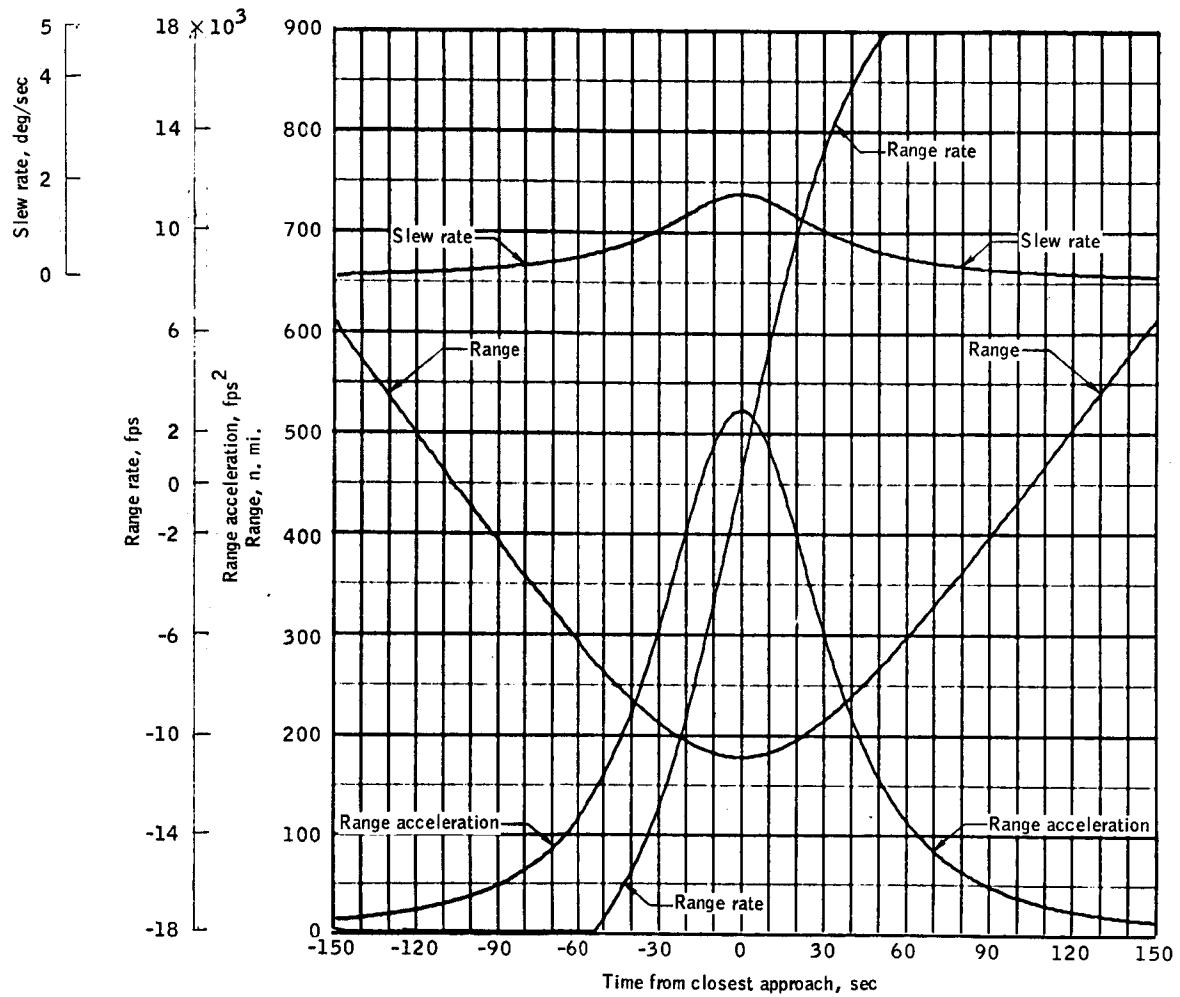
(yy) Revolution 162.

Figure 1.- Concluded.



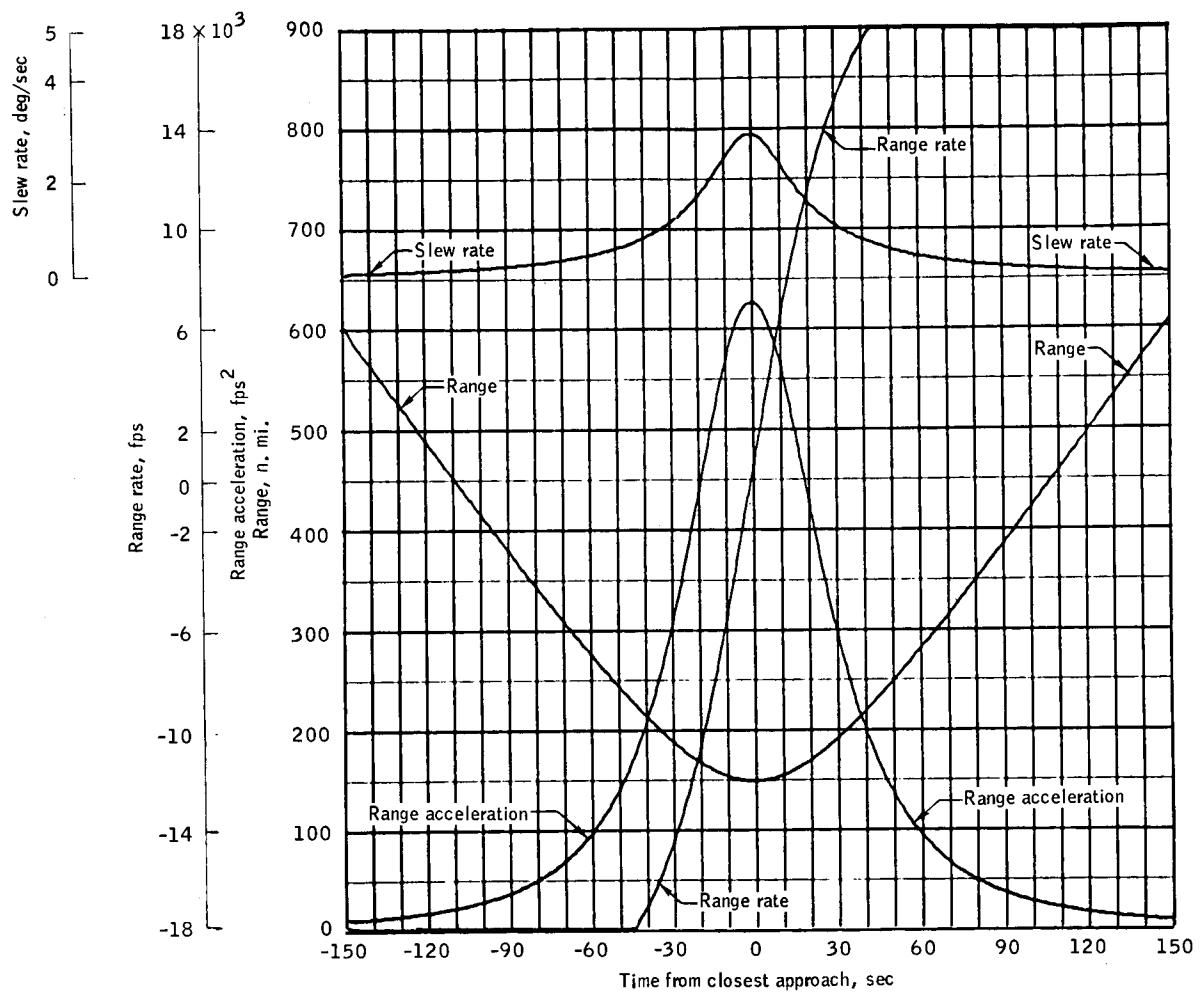
(a) Revolution 1.

Figure 2.- Radar data for the Houston station based on the Mission C reference trajectory.



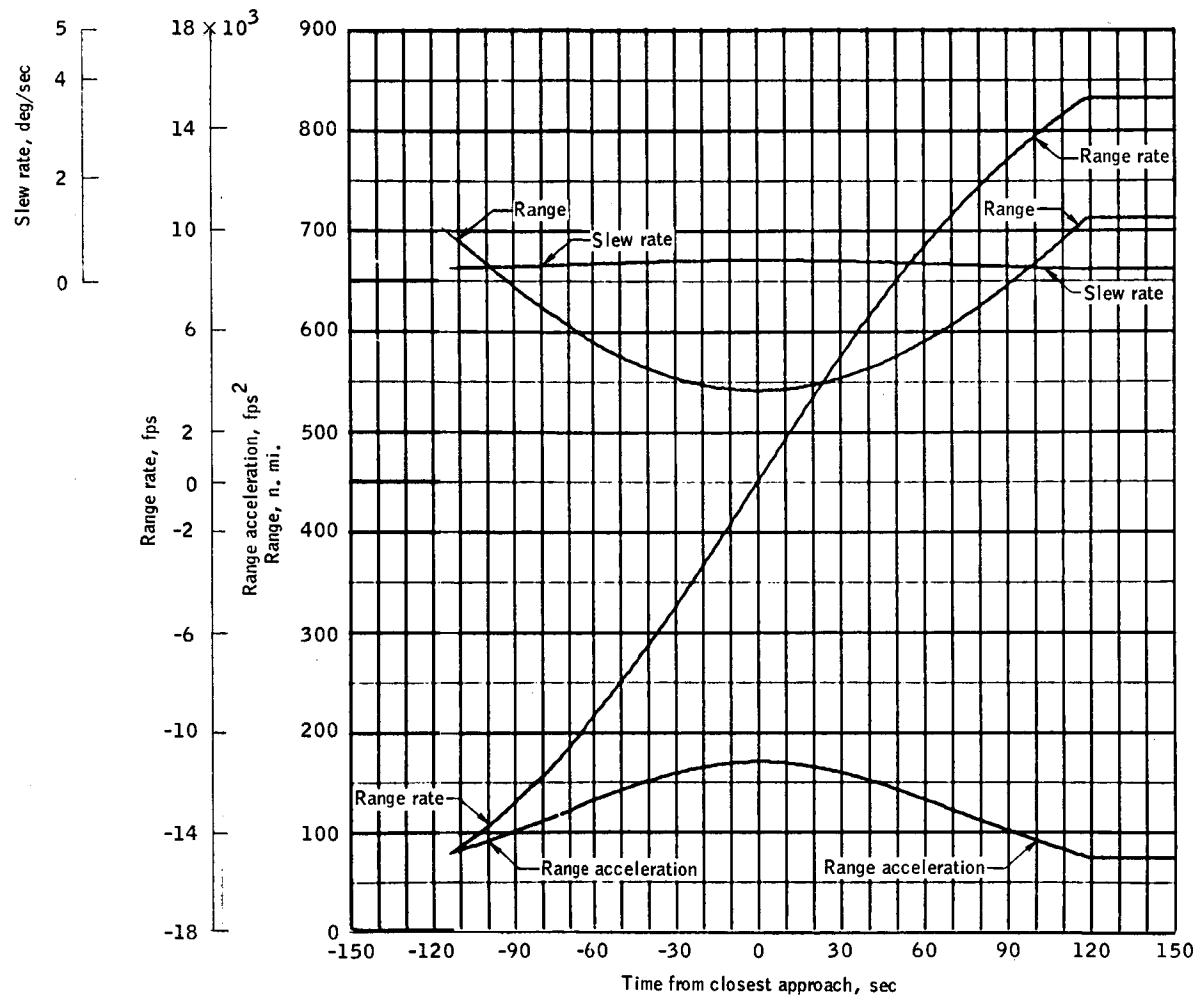
(b) Revolution 2.

Figure 2.- Continued.



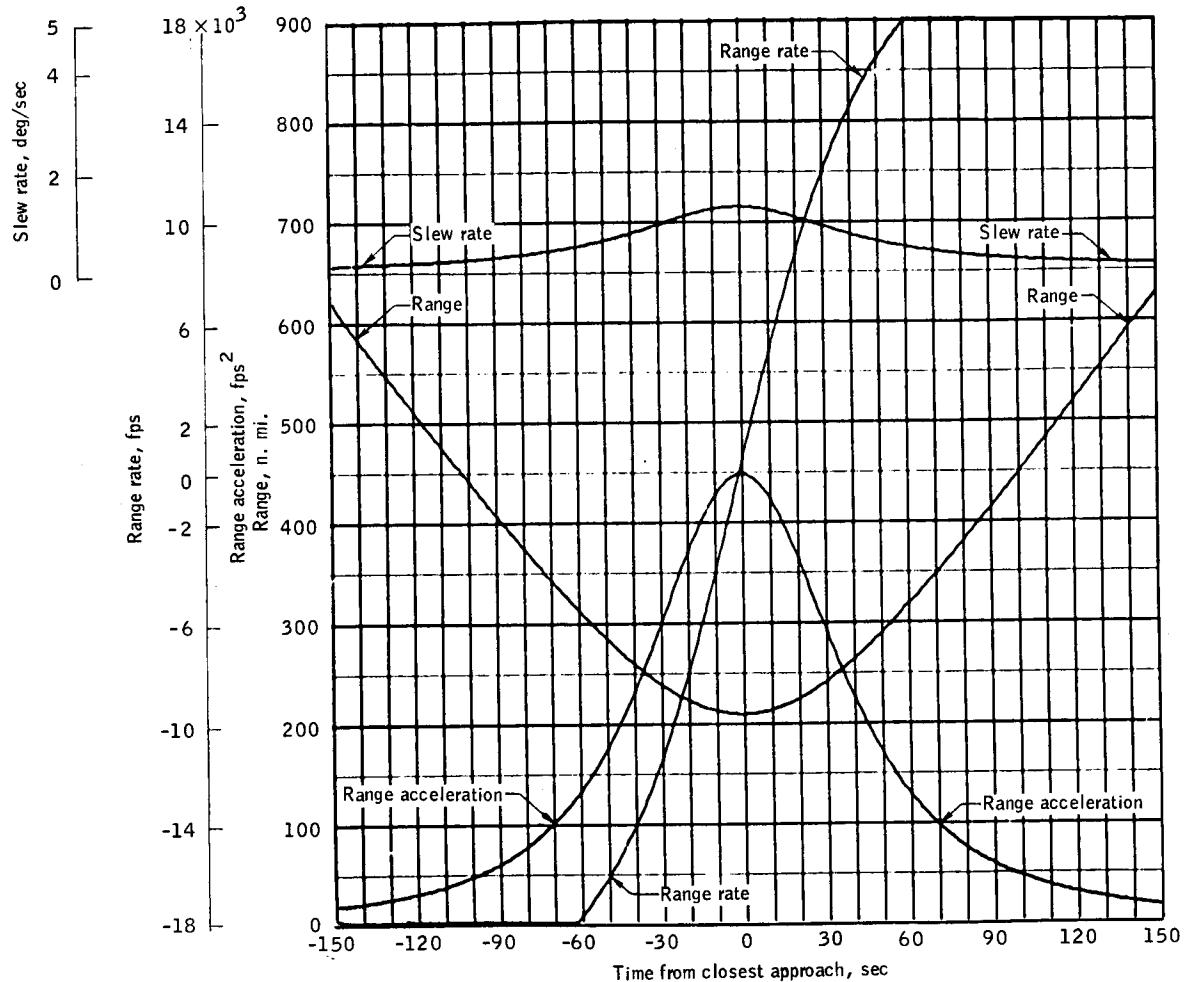
(c) Revolution 3.

Figure 2. - Continued.



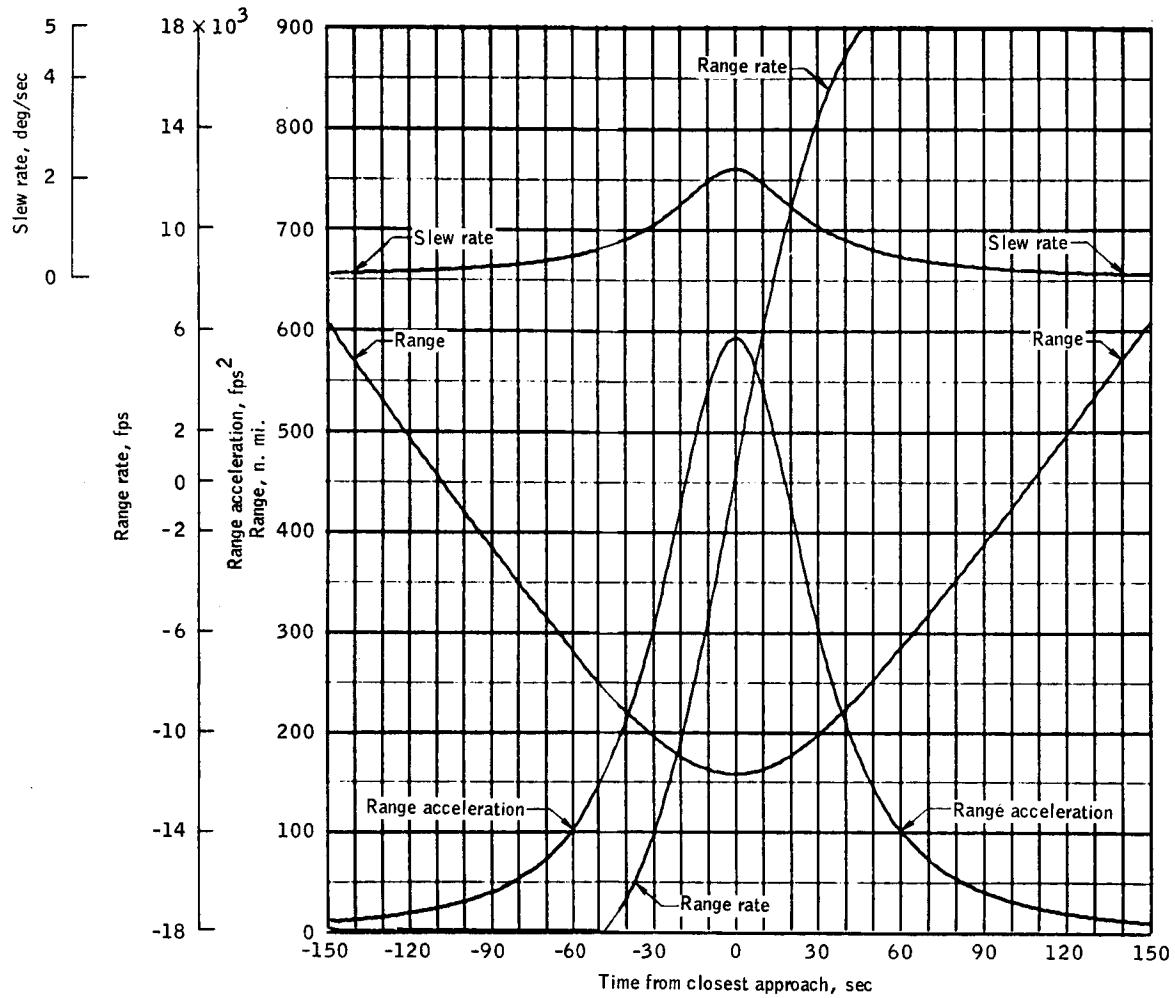
(d) Revolution 4.

Figure 2.- Continued.



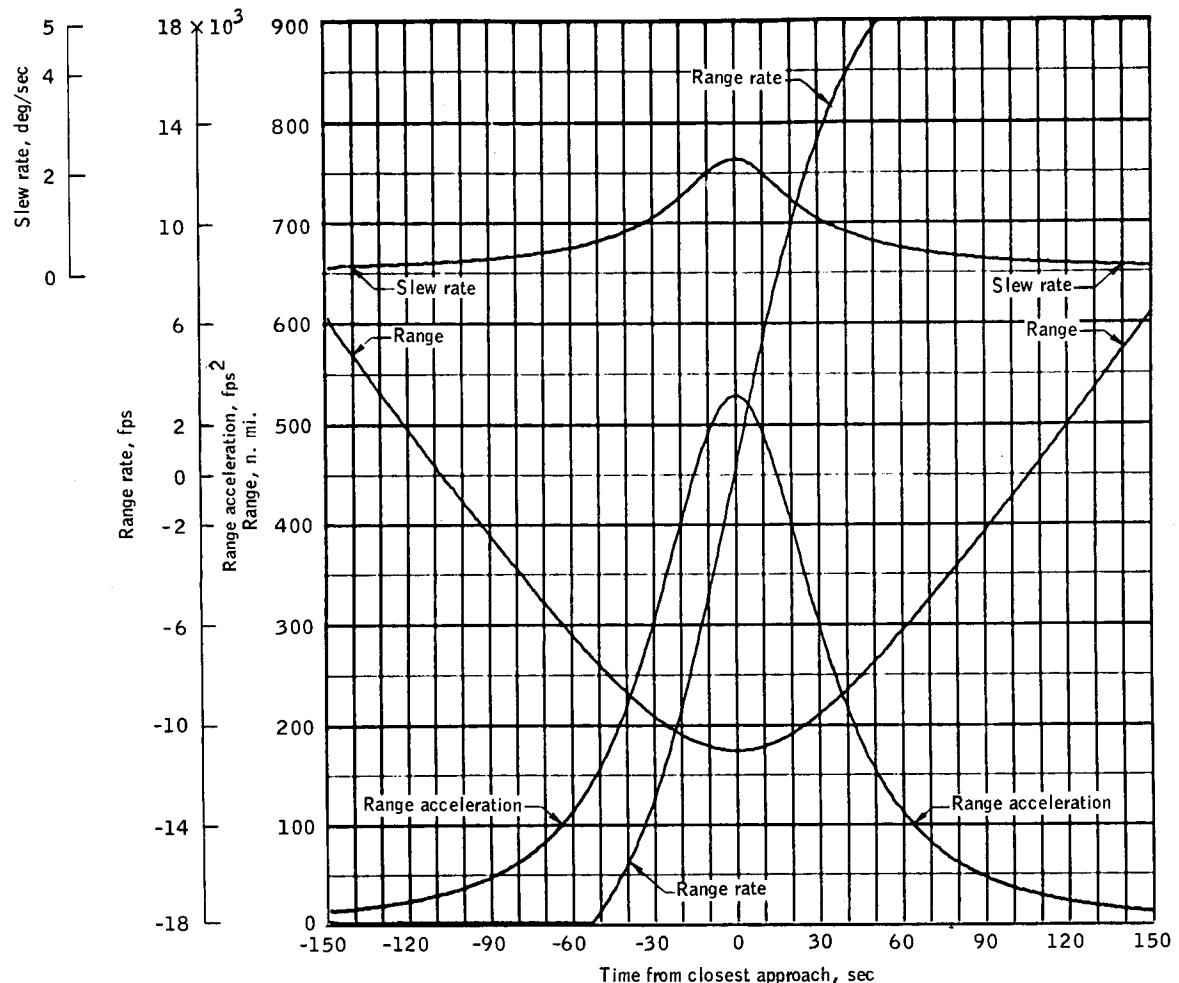
(e) Revolution 15.

Figure 2. - Continued.



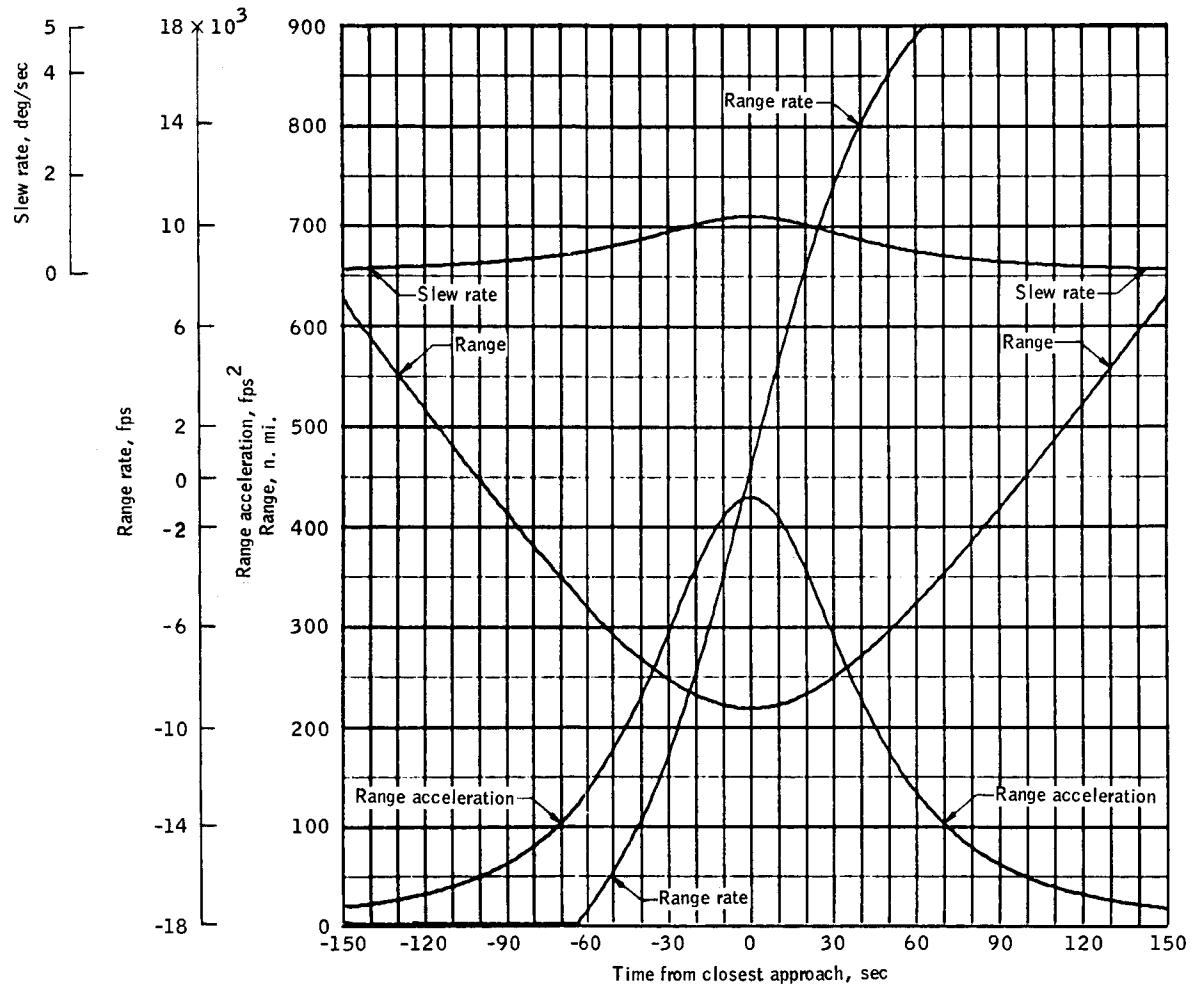
(f) Revolution 16.

Figure 2.- Continued.



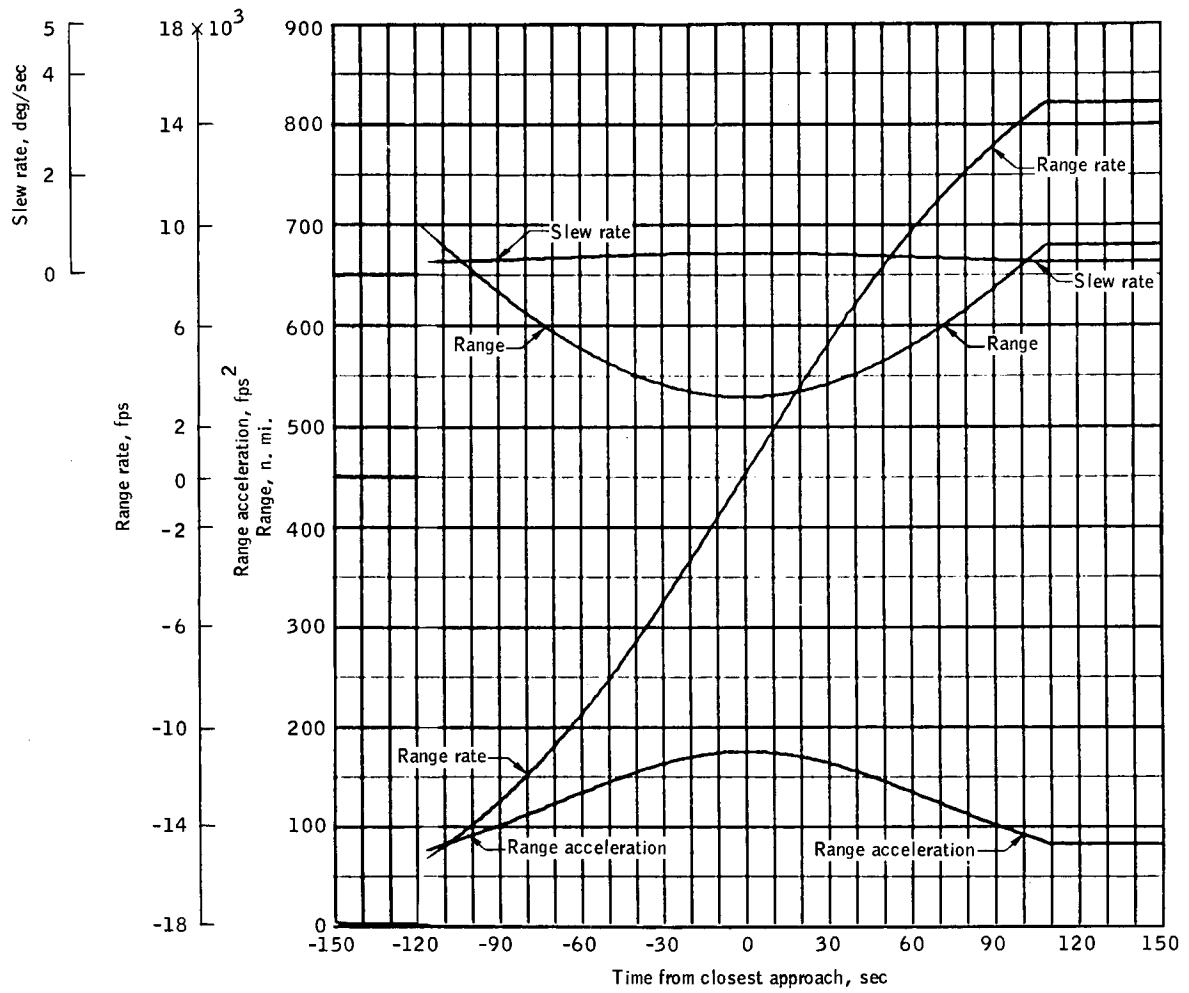
(g) Revolution 17.

Figure 2.- Continued.



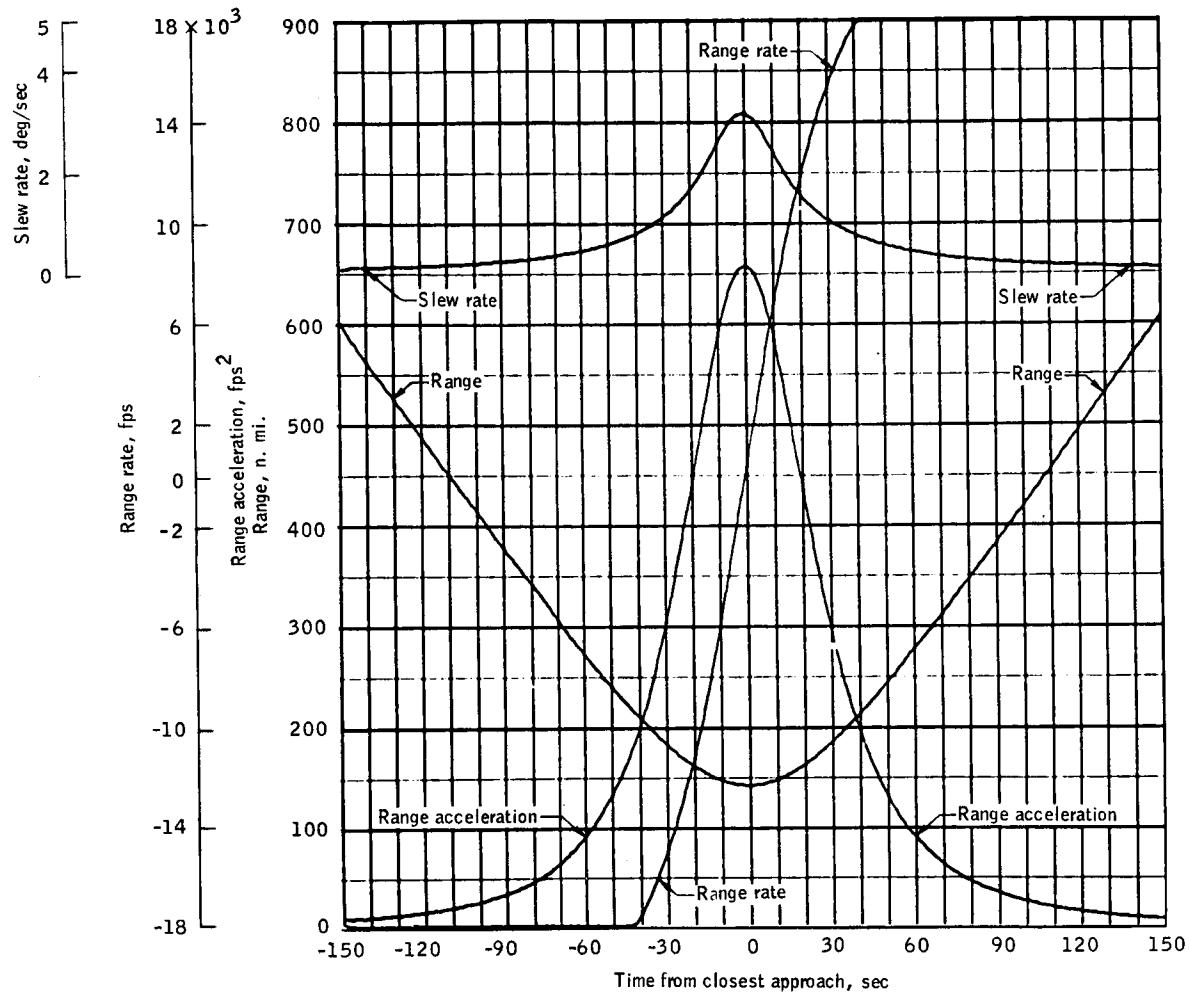
(h) Revolution 18.

Figure 2.- Continued.



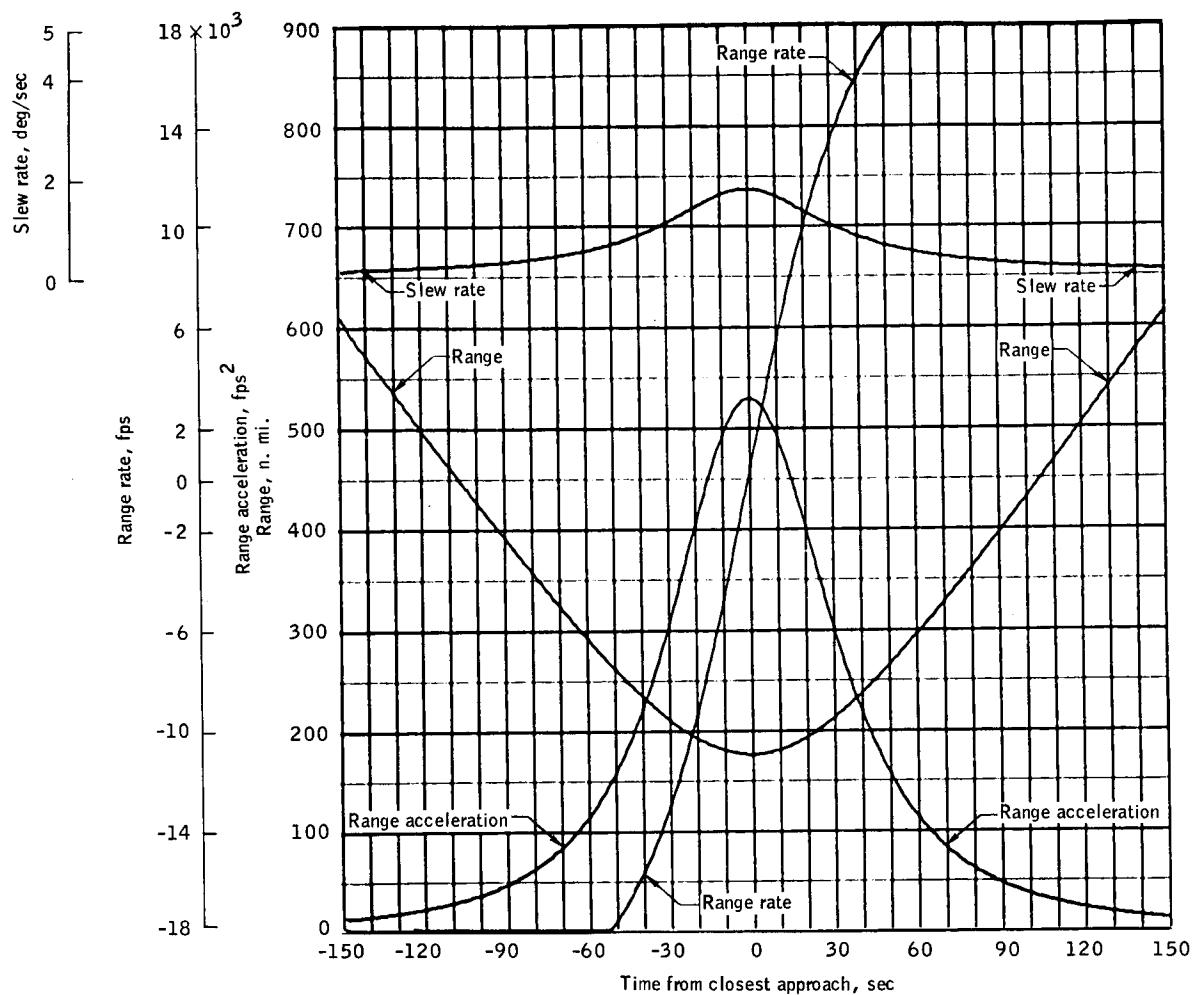
(i) Revolution 19.

Figure 2. - Continued.



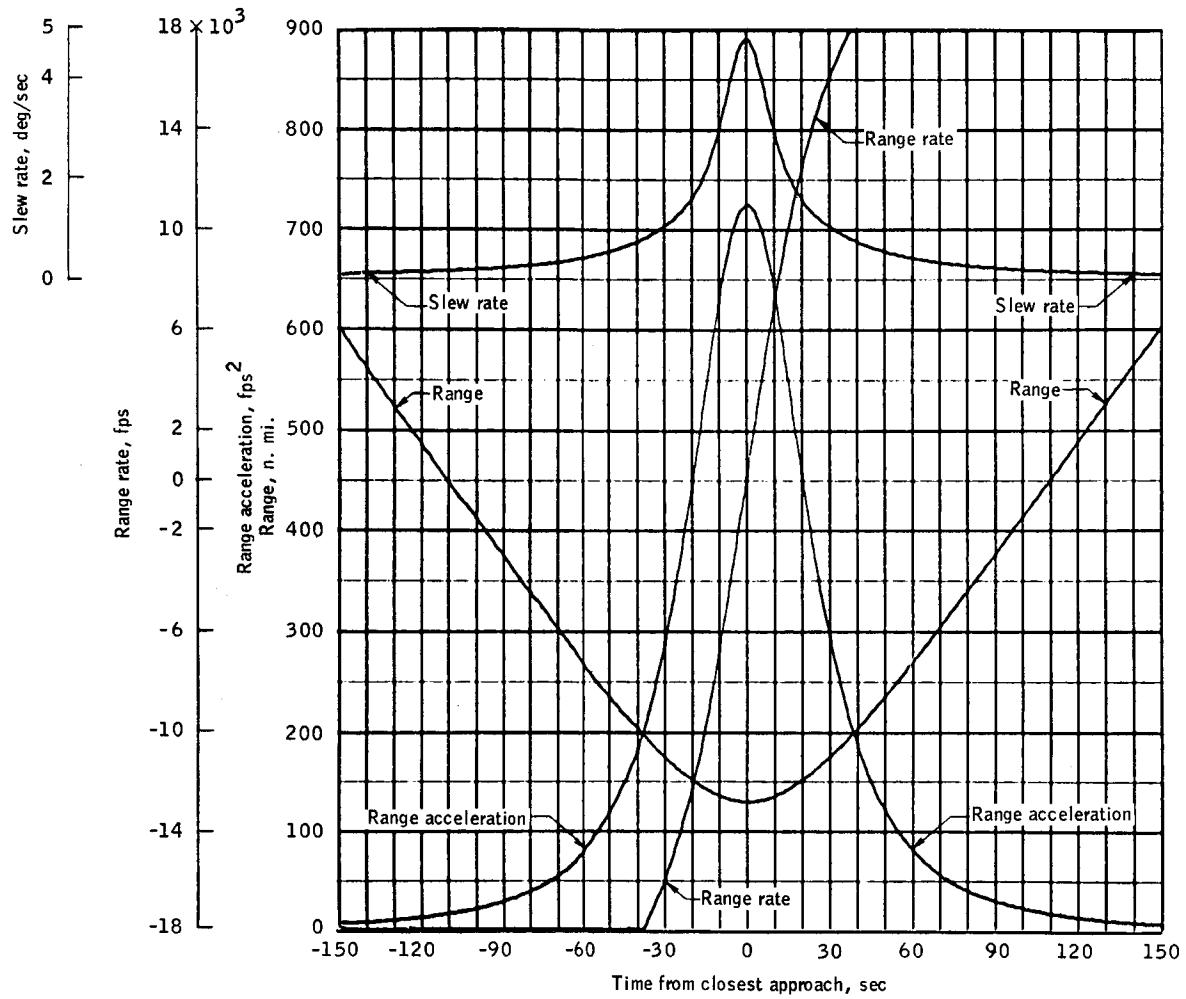
(j) Revolution 30.

Figure 2.- Continued.



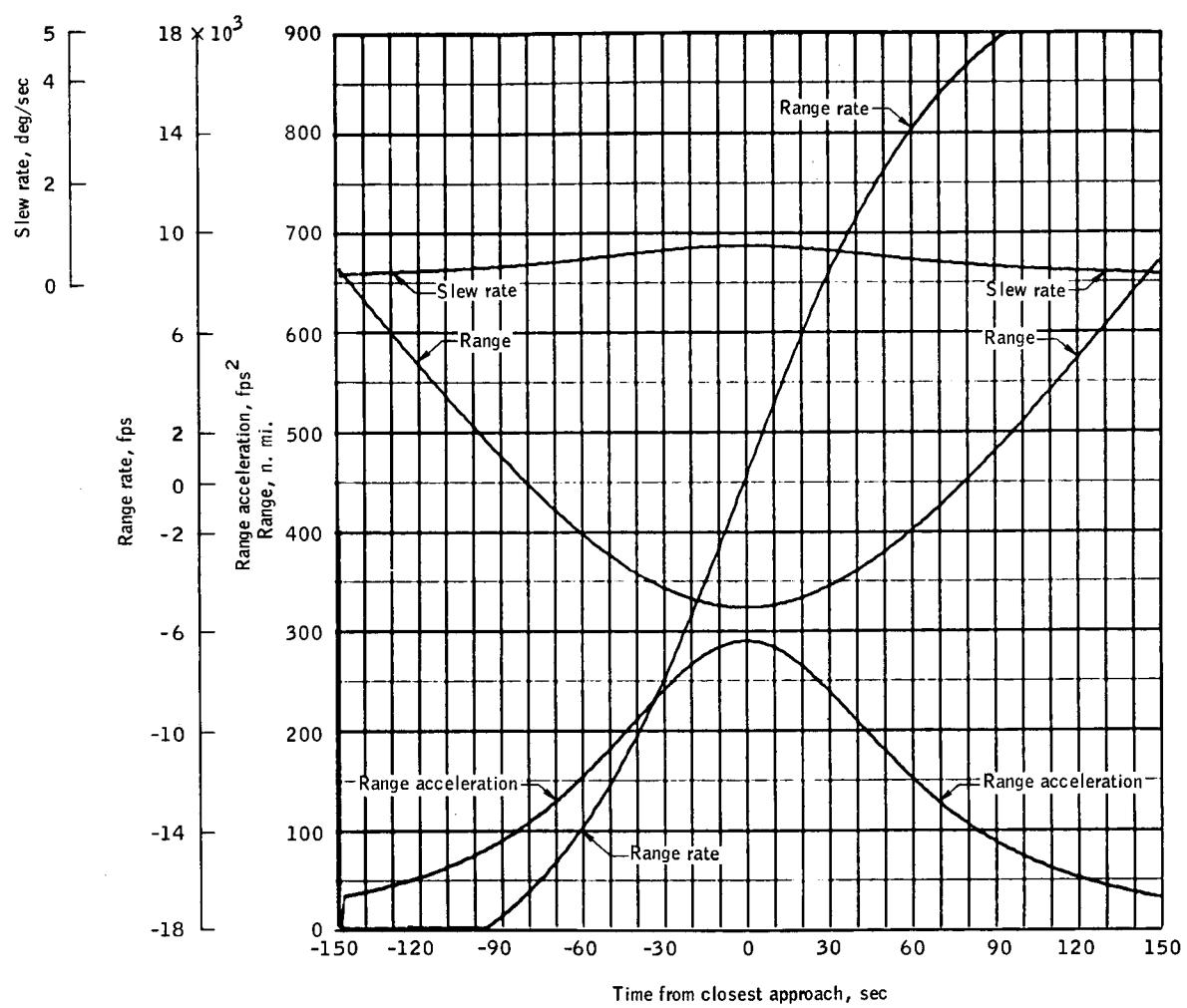
(k) Revolution 31.

Figure 2.- Continued.



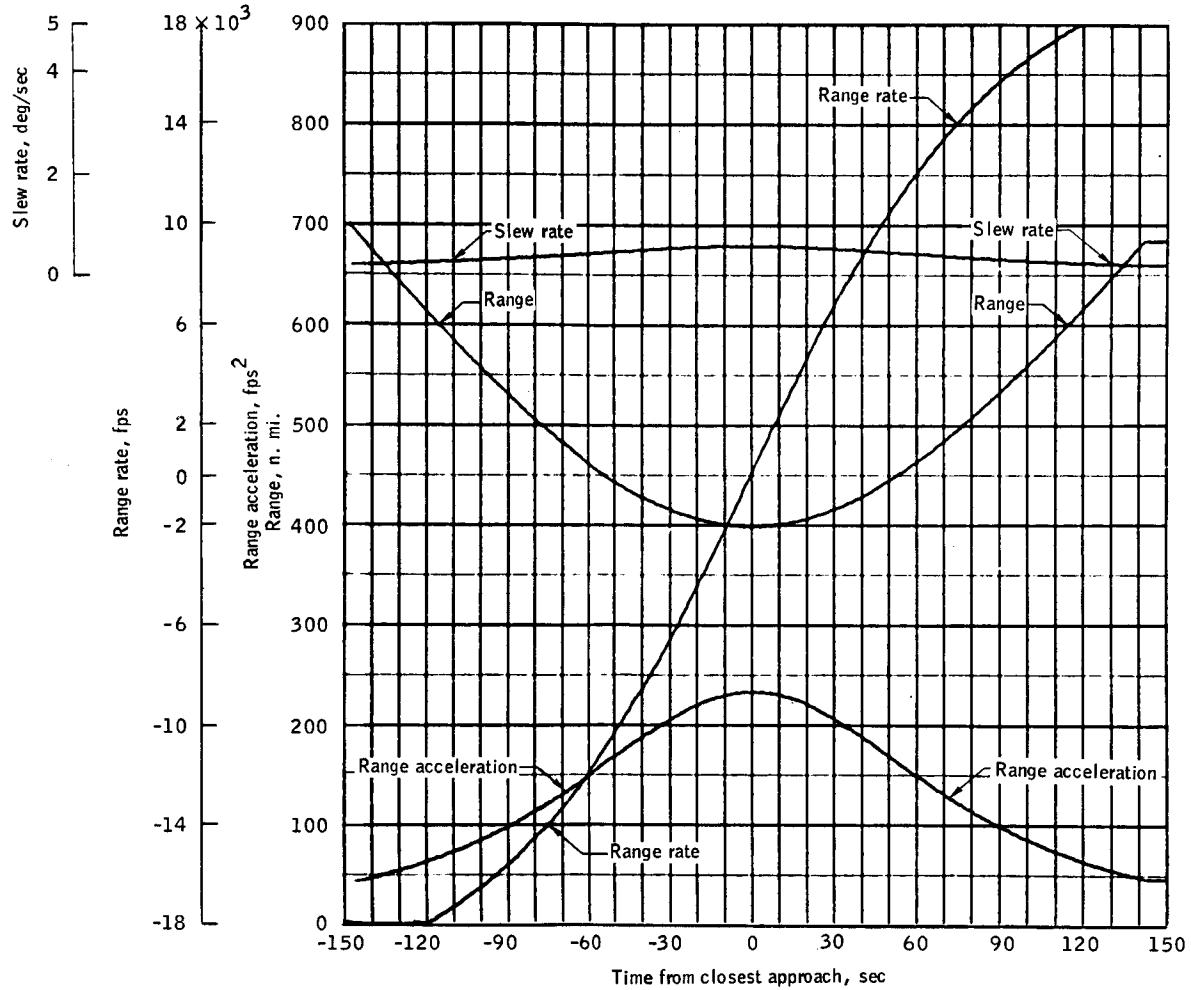
(I) Revolution 32.

Figure 2.- Continued.



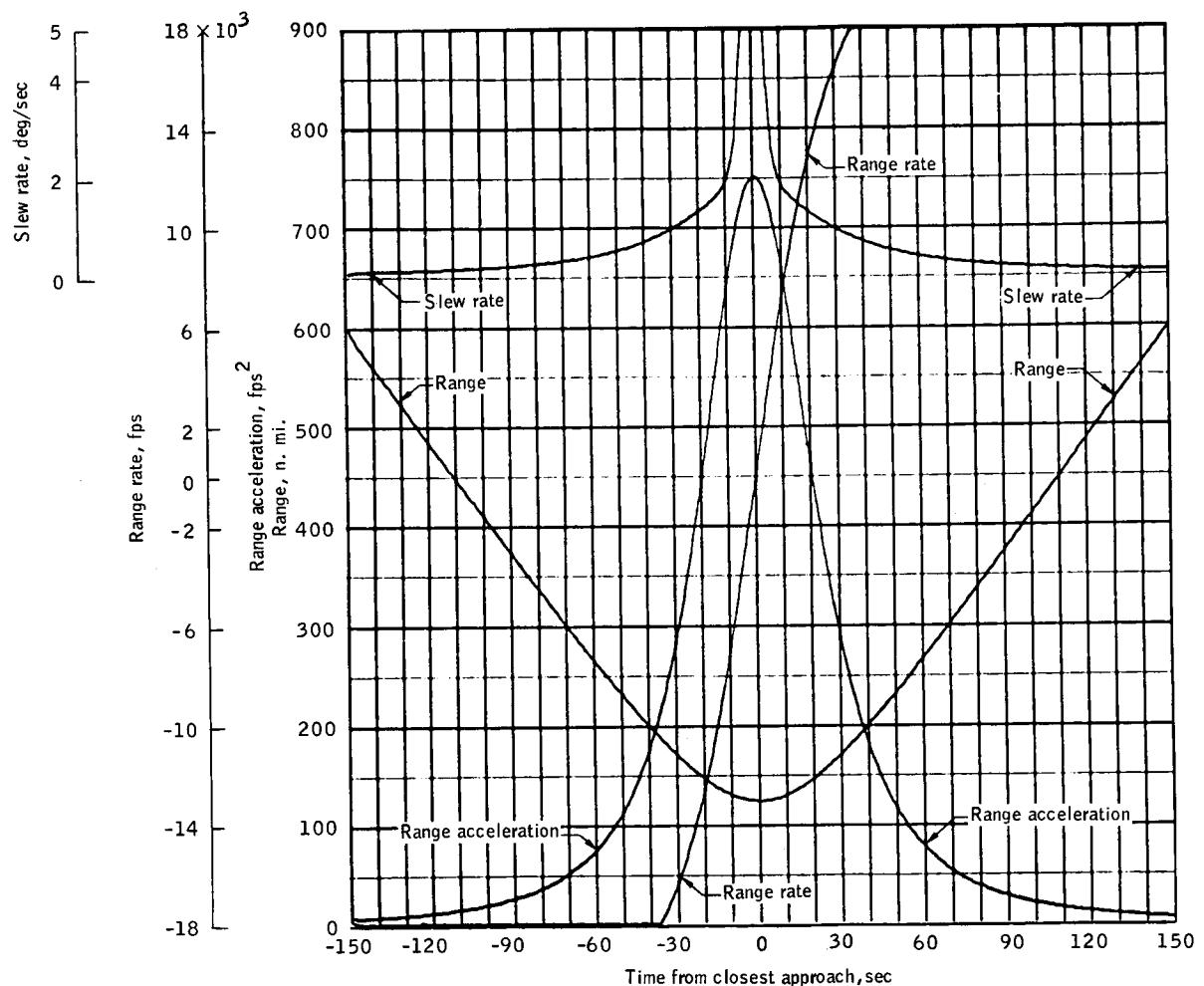
(m) Revolution 33.

Figure 2. - Continued.



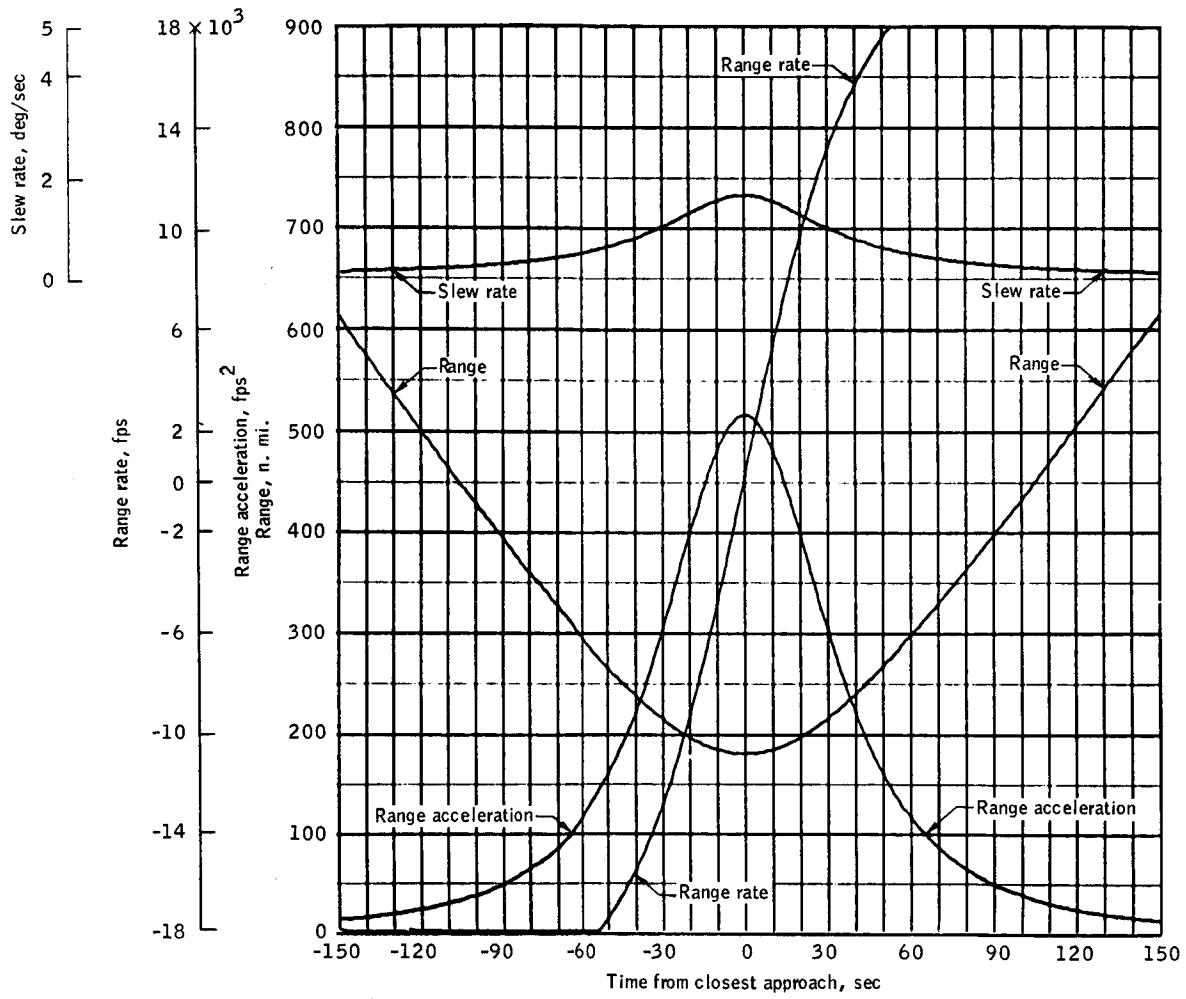
(n) Revolution 34.

Figure 2.- Continued.



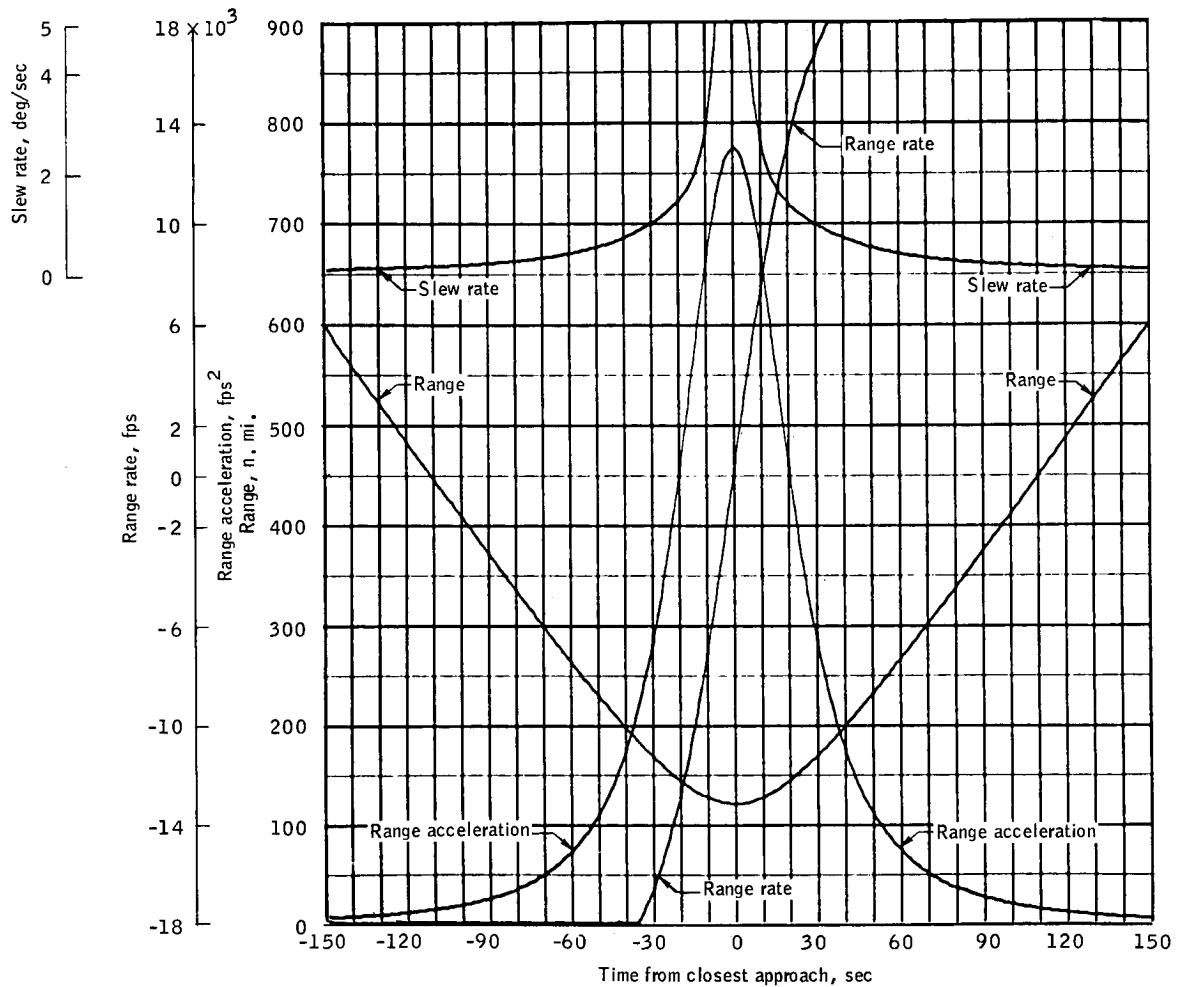
(o) Revolution 45.

Figure 2.- Continued.



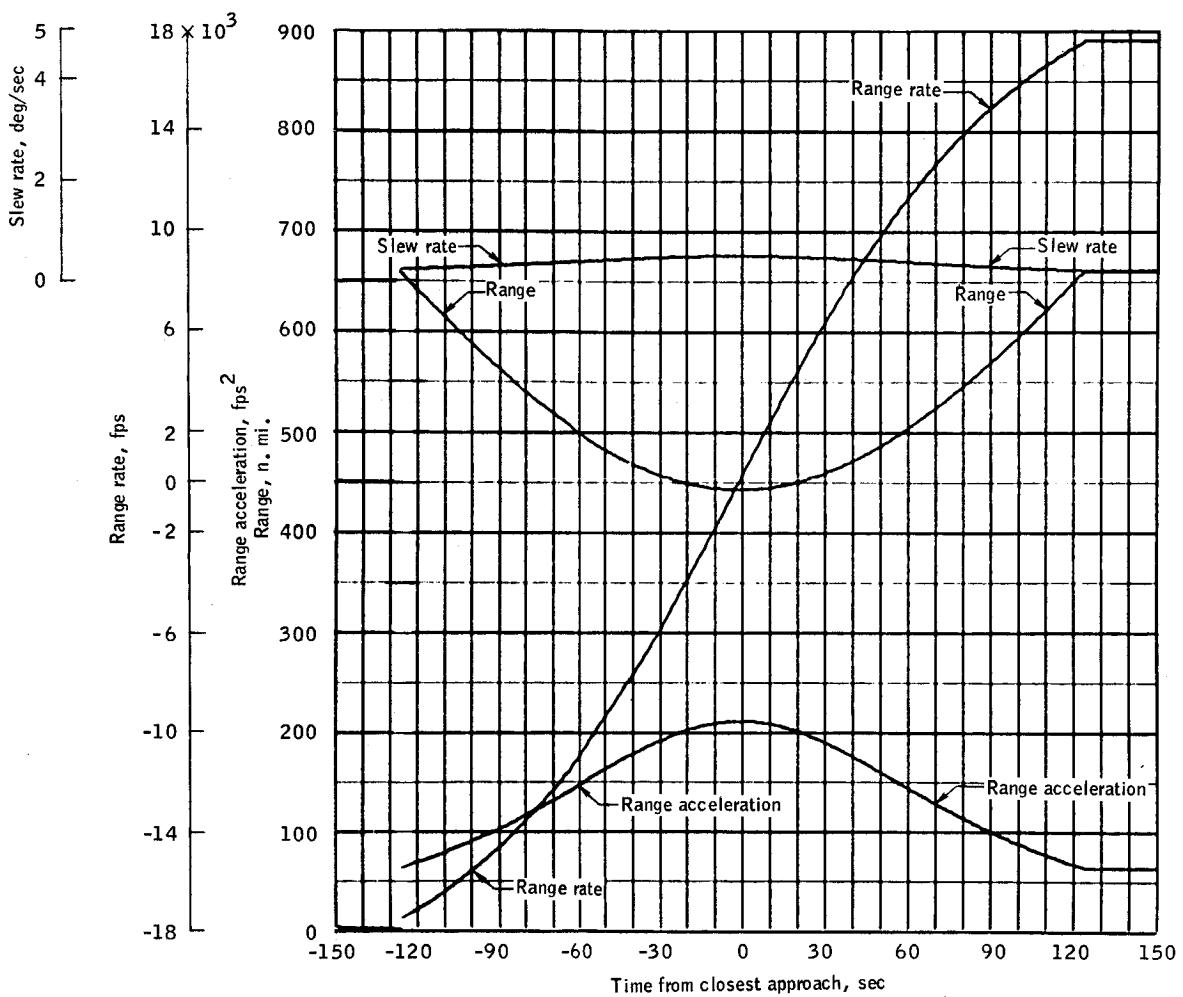
(p) Revolution 46.

Figure 2. - Continued.



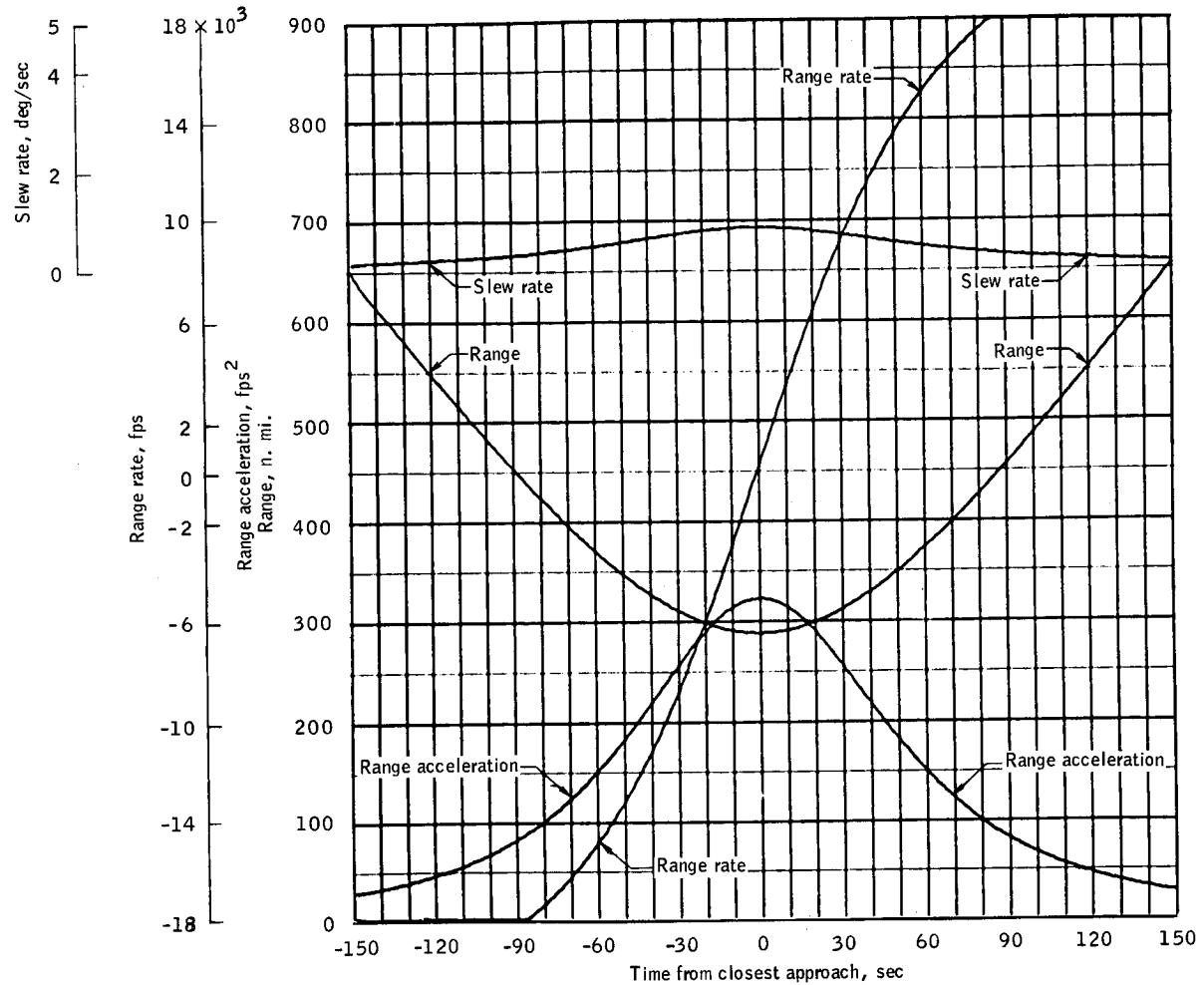
(q) Revolution 47.

Figure 2.- Continued.



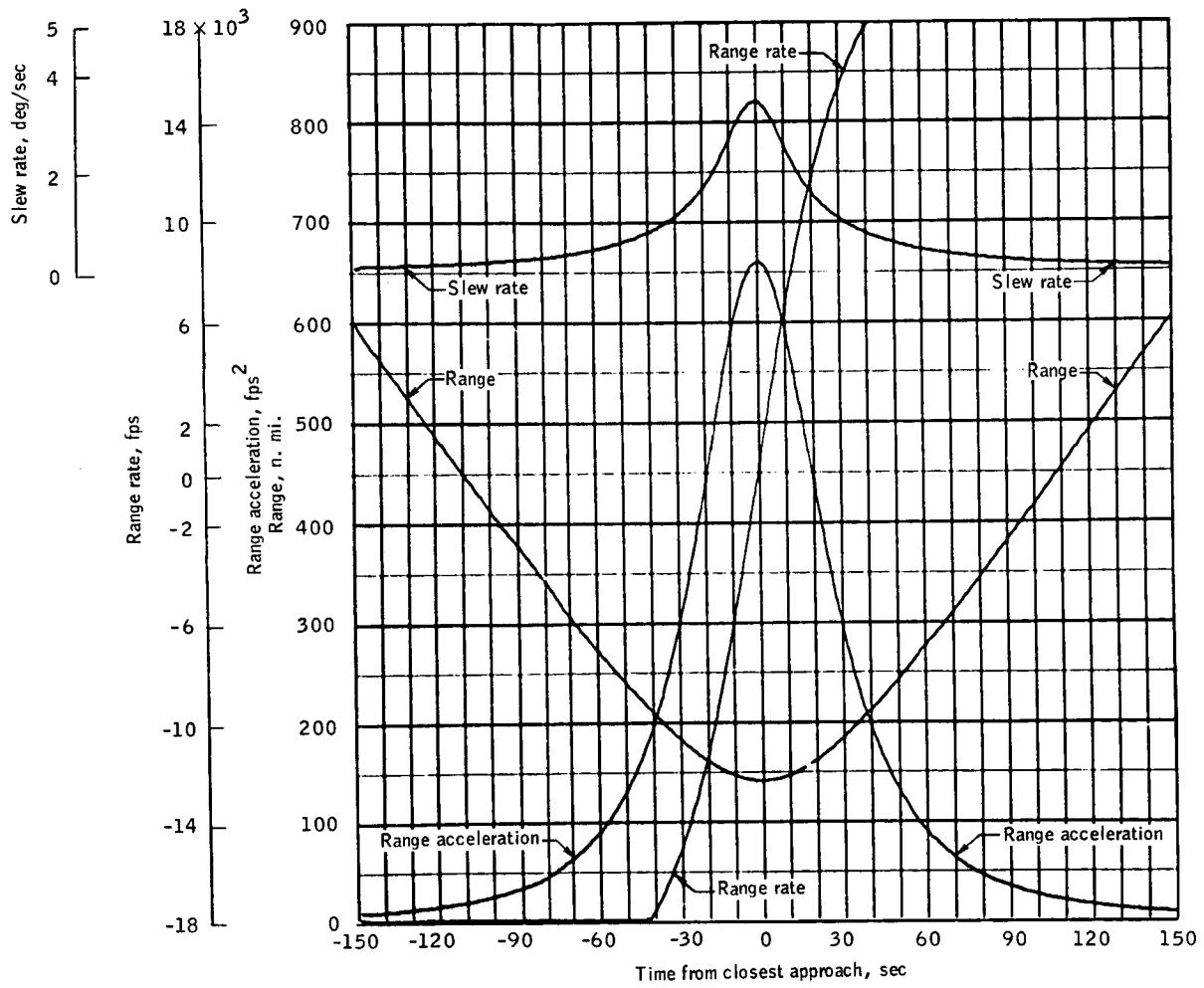
(r) Revolution 48.

Figure 2.- Continued.



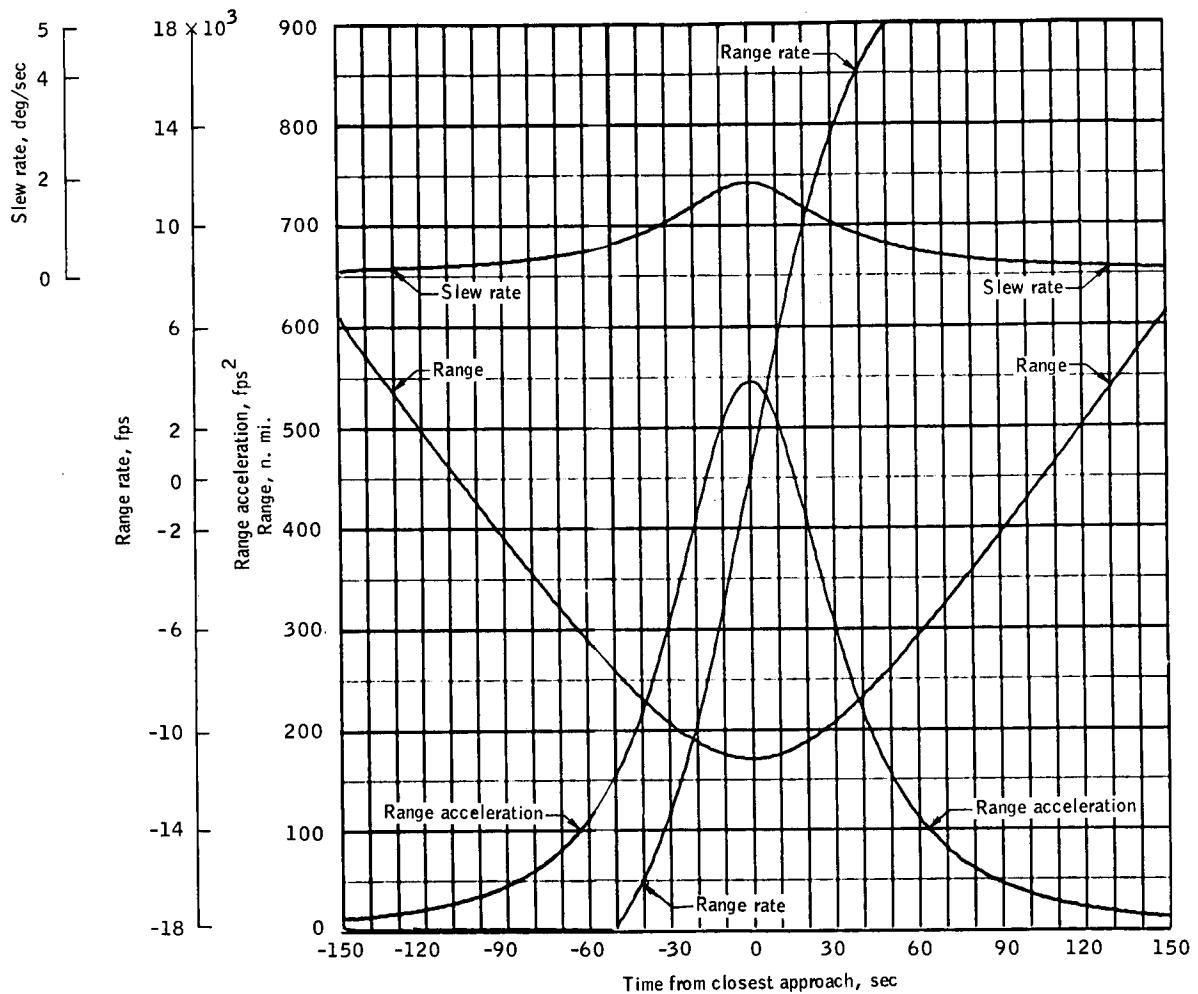
(s) Revolution 59.

Figure 2.- Continued.



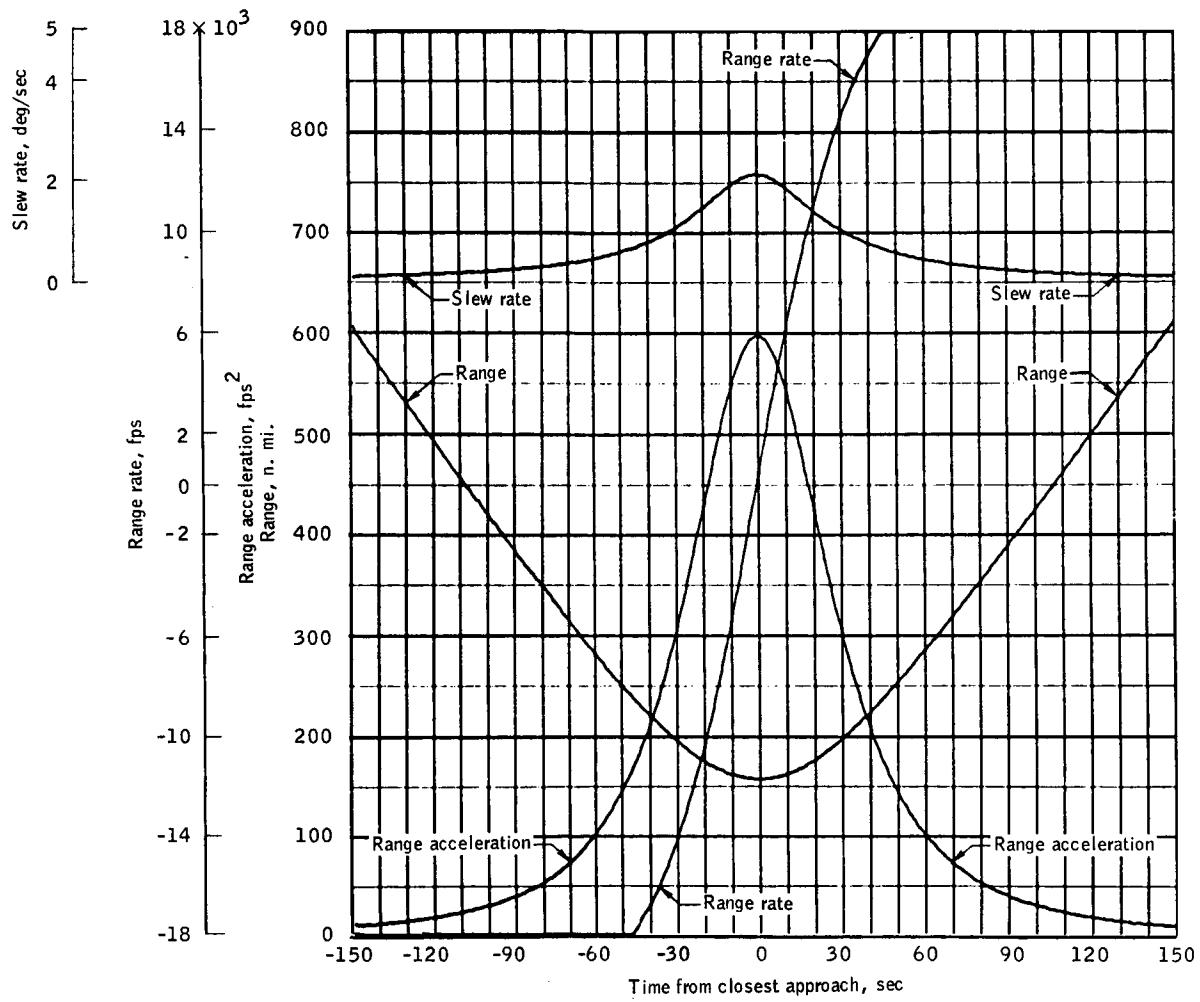
(t) Revolution 60.

Figure 2. - Continued.



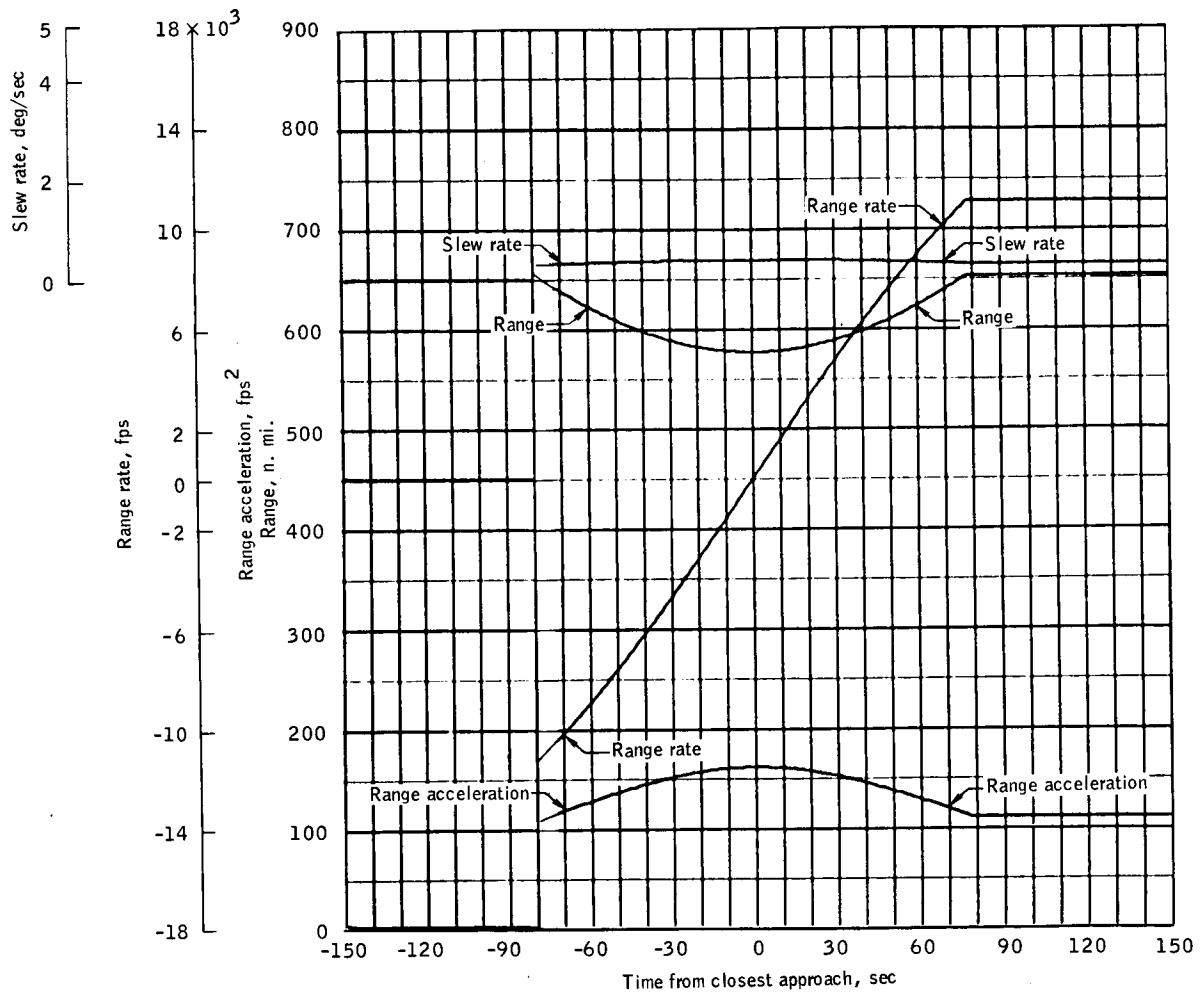
(u) Revolution 61.

Figure 2.- Continued.



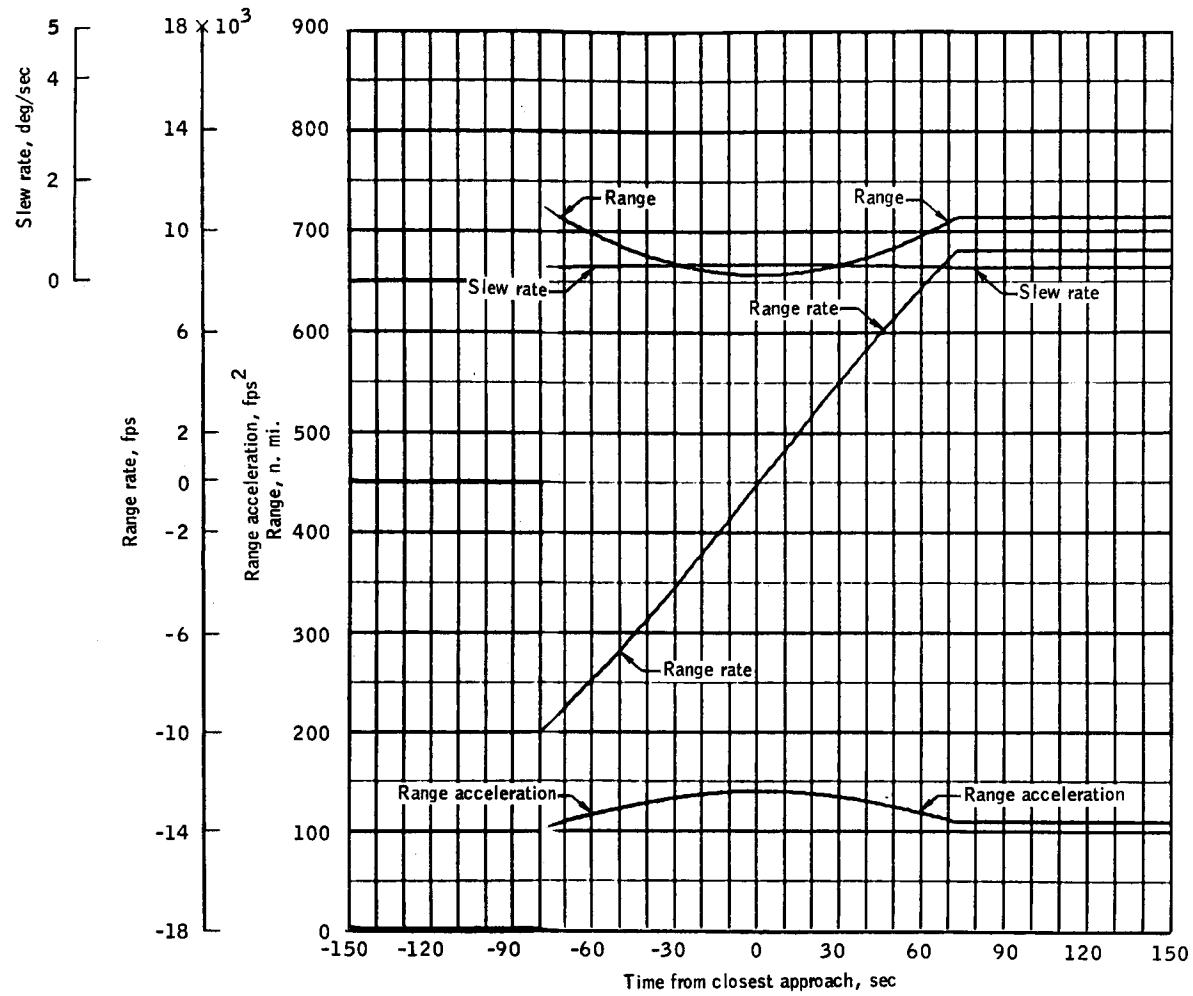
(v) Revolution 62.

Figure 2.- Continued.



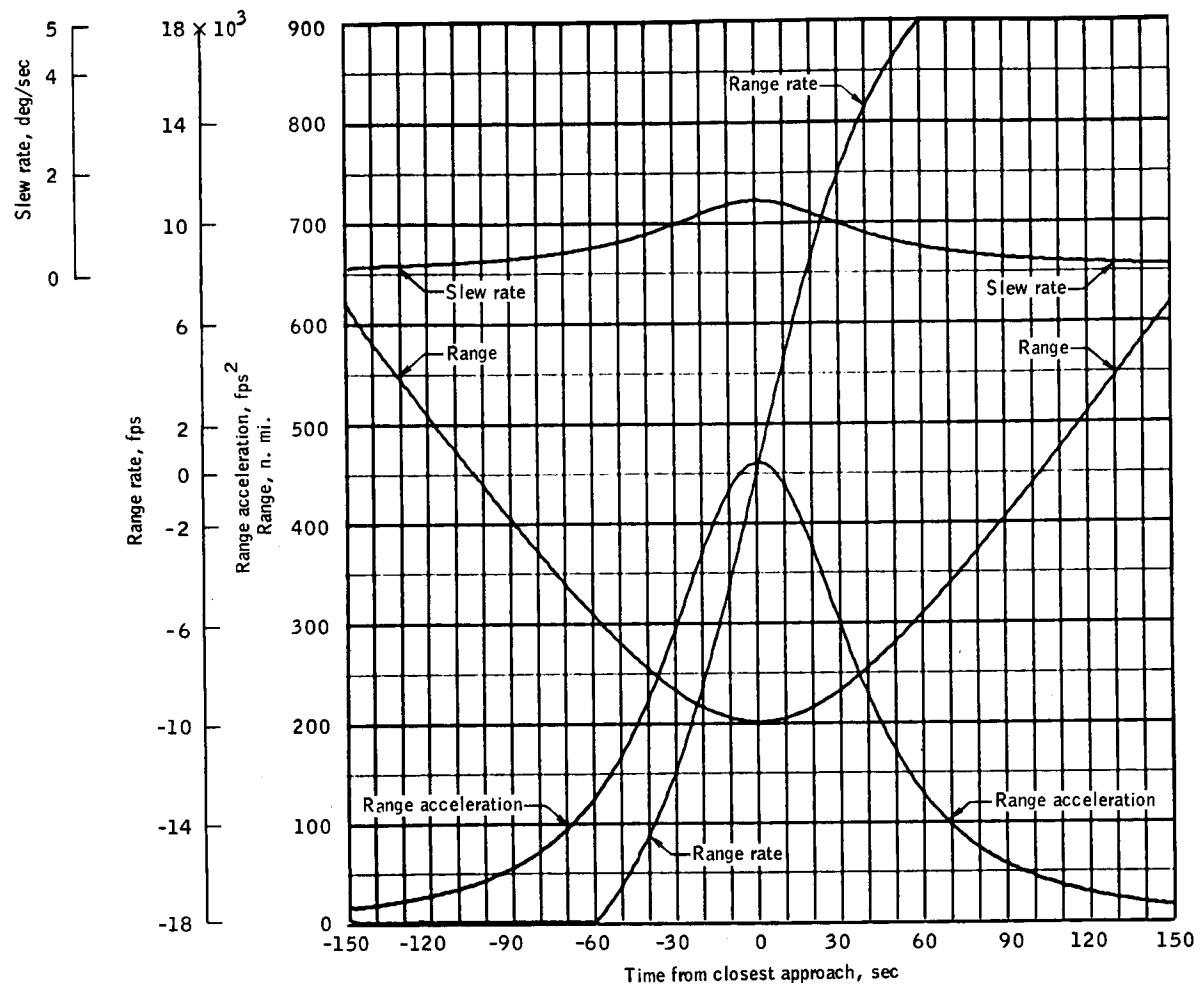
(w) Revolution 63.

Figure 2.- Continued.



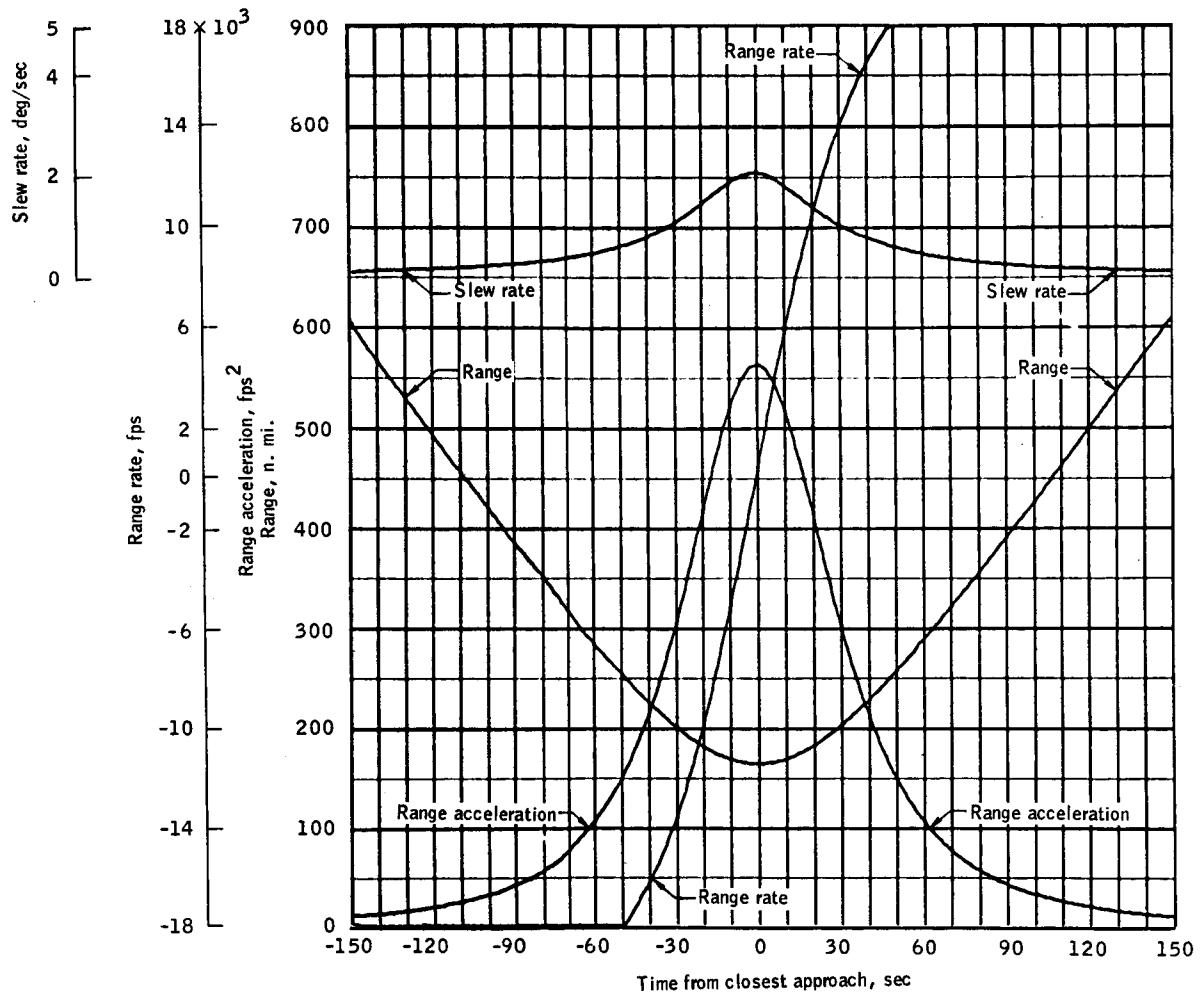
(x) Revolution 73.

Figure 2.- Continued.



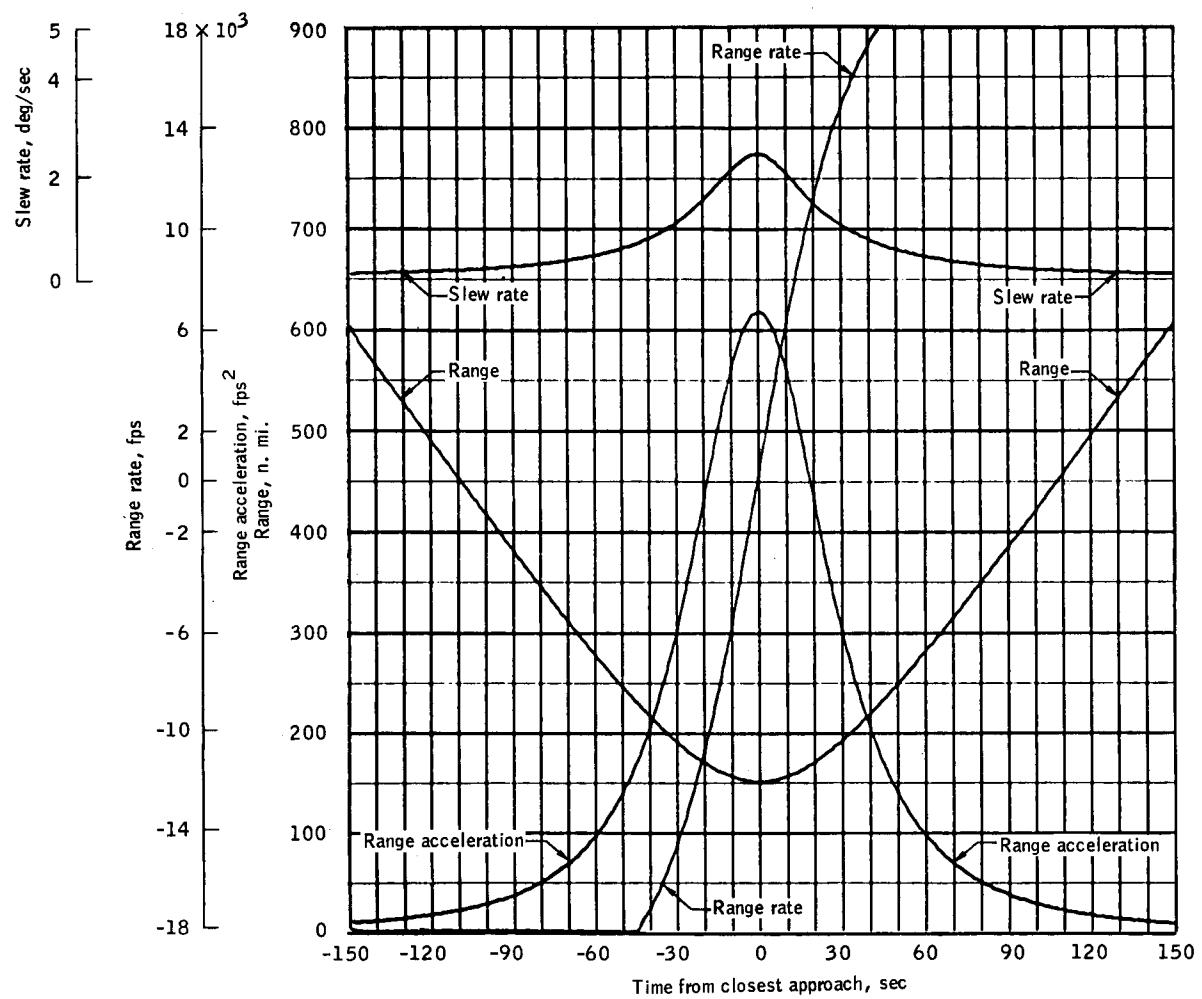
(y) Revolution 74.

Figure 2.- Continued.



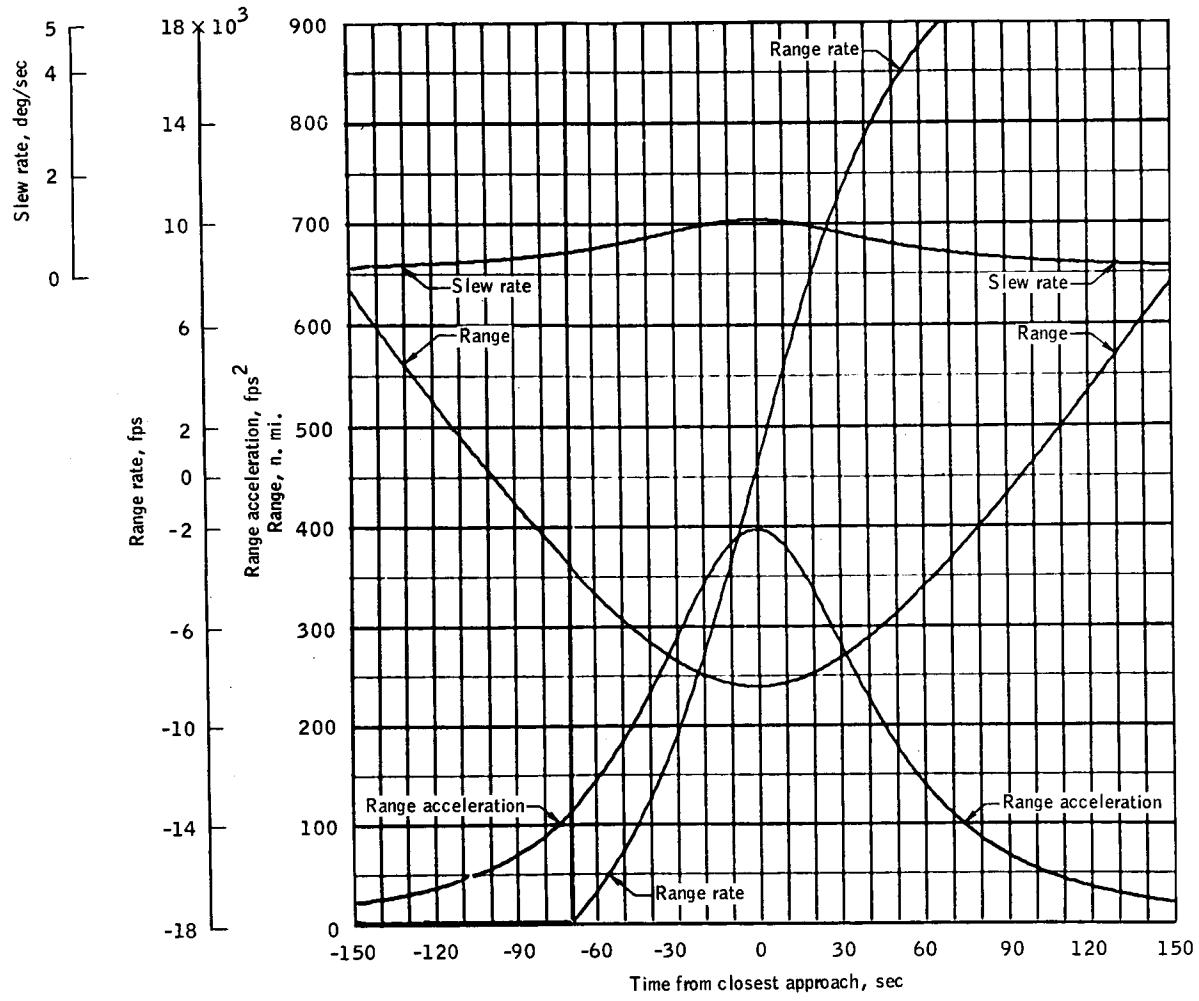
(z) Revolution 75.

Figure 2.- Continued.



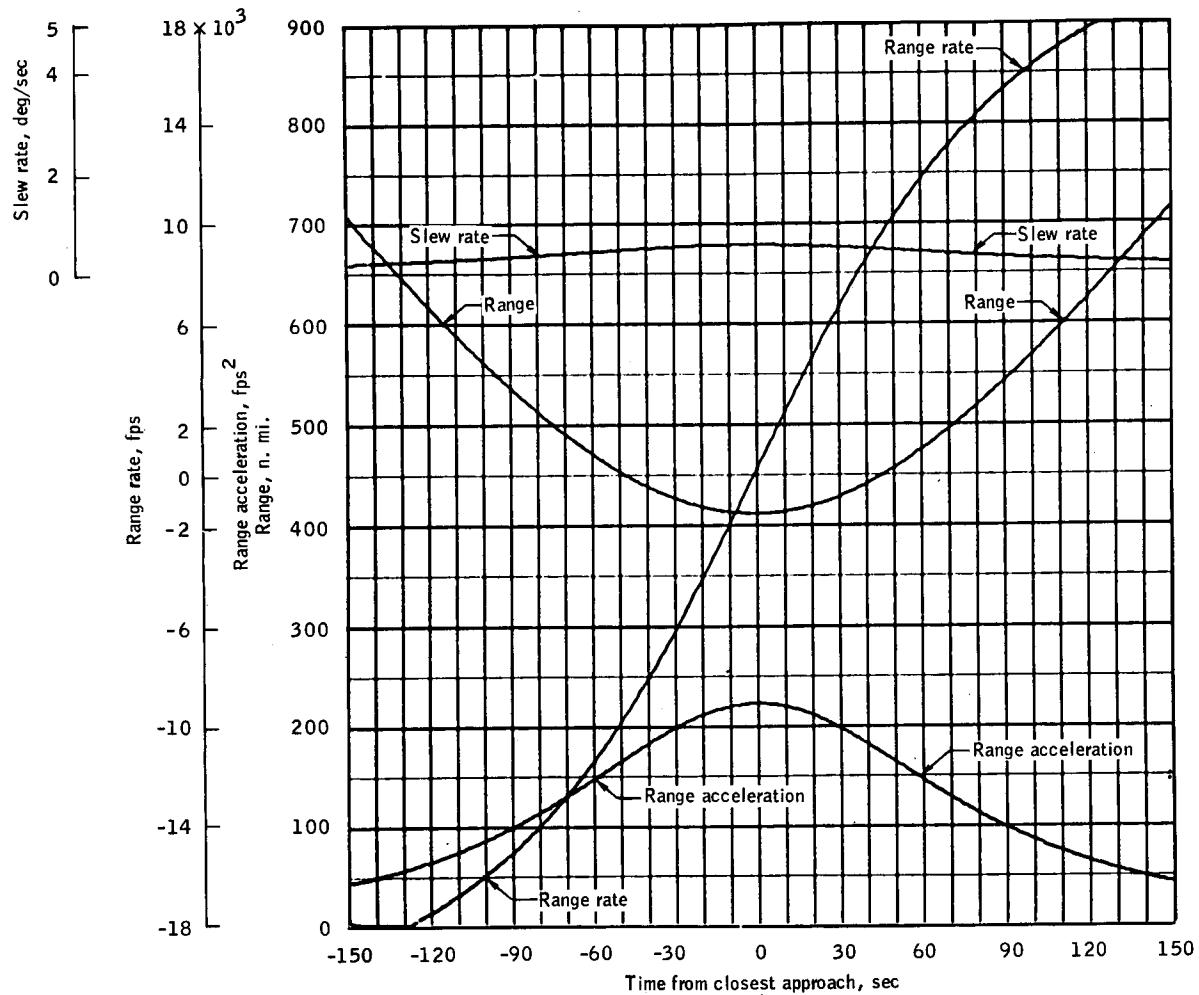
(aa) Revolution 76.

Figure 2.- Continued.



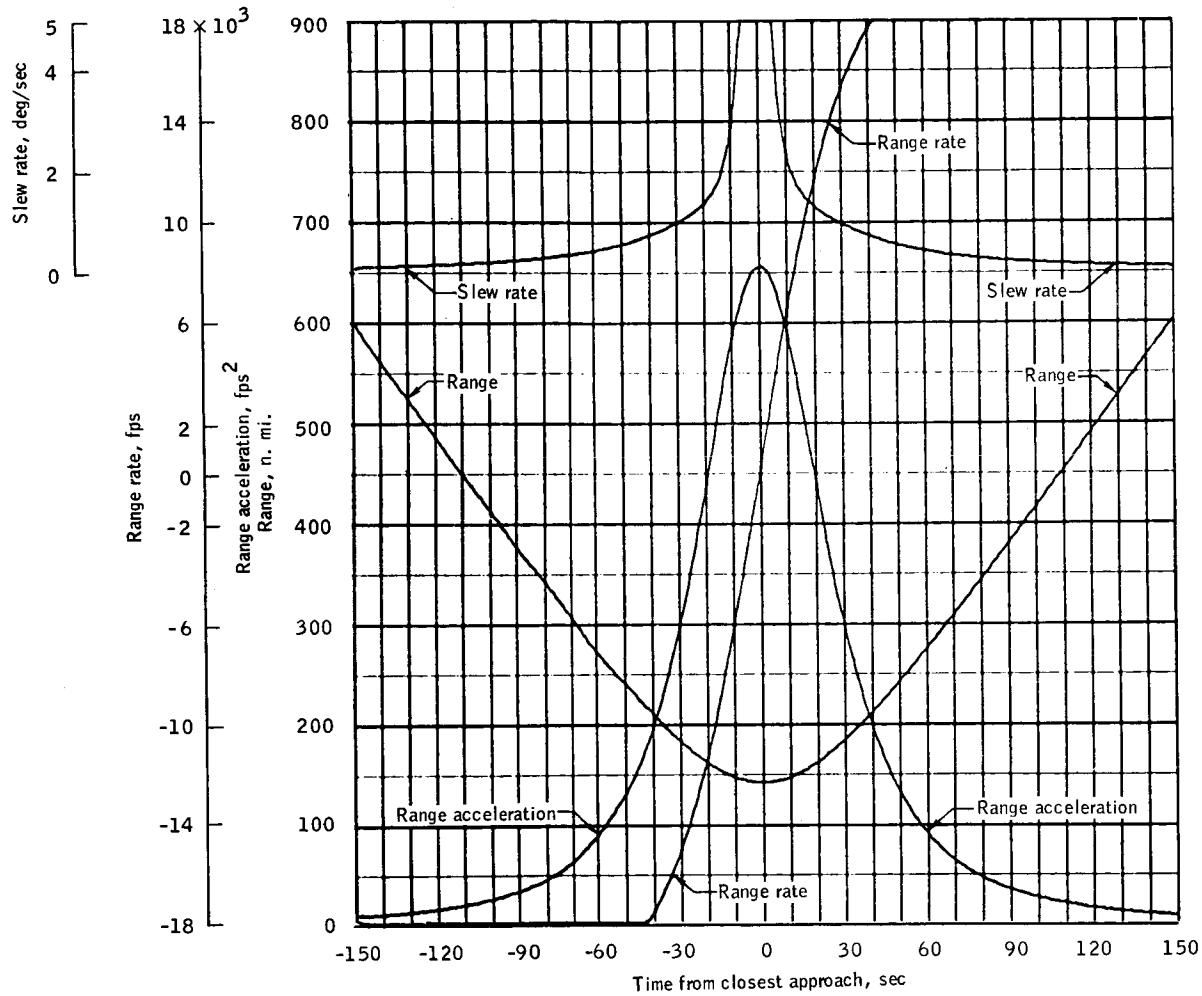
(bb) Revolution 77.

Figure 2.- Continued.



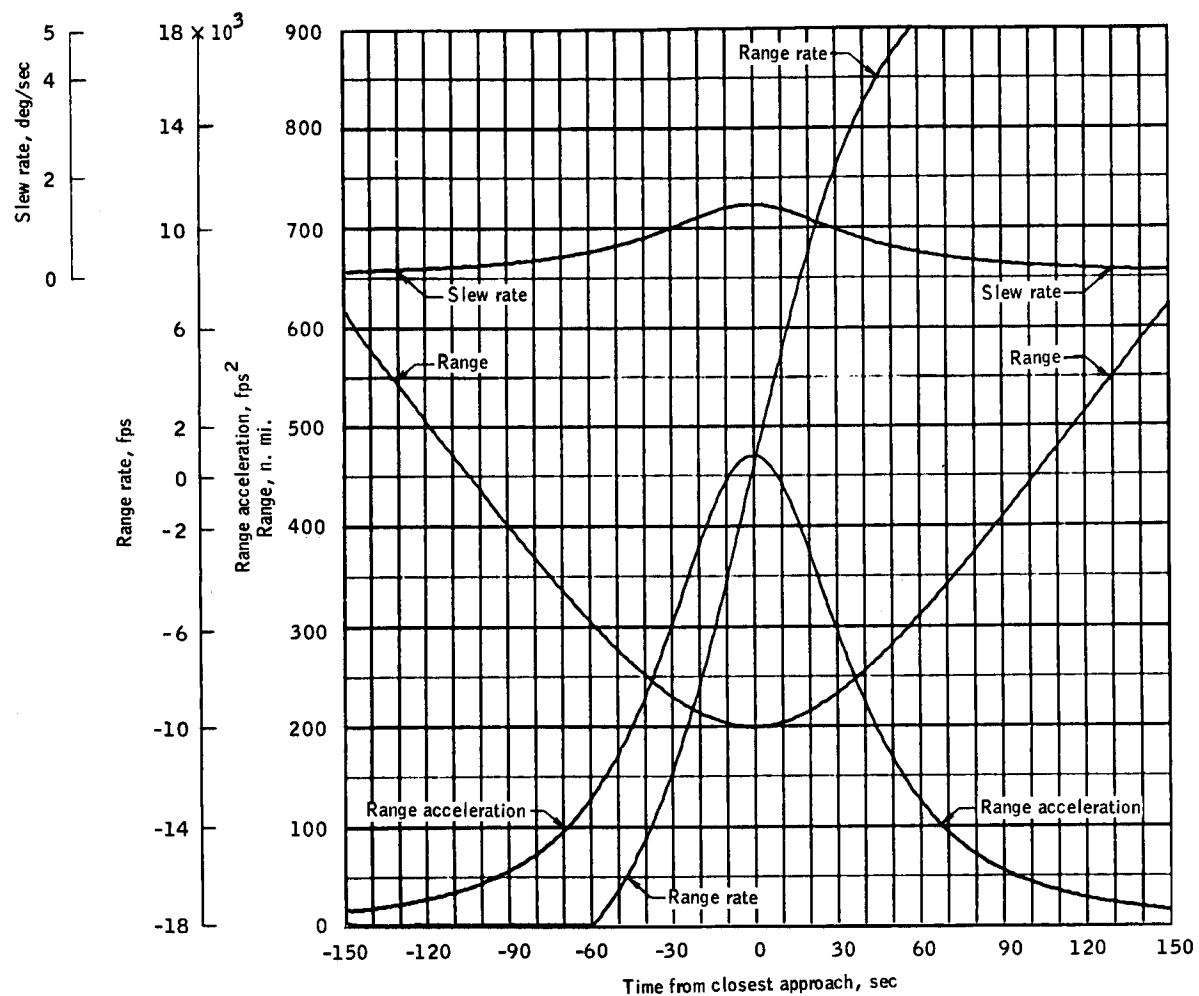
(cc) Revolution 88.

Figure 2.- Continued.



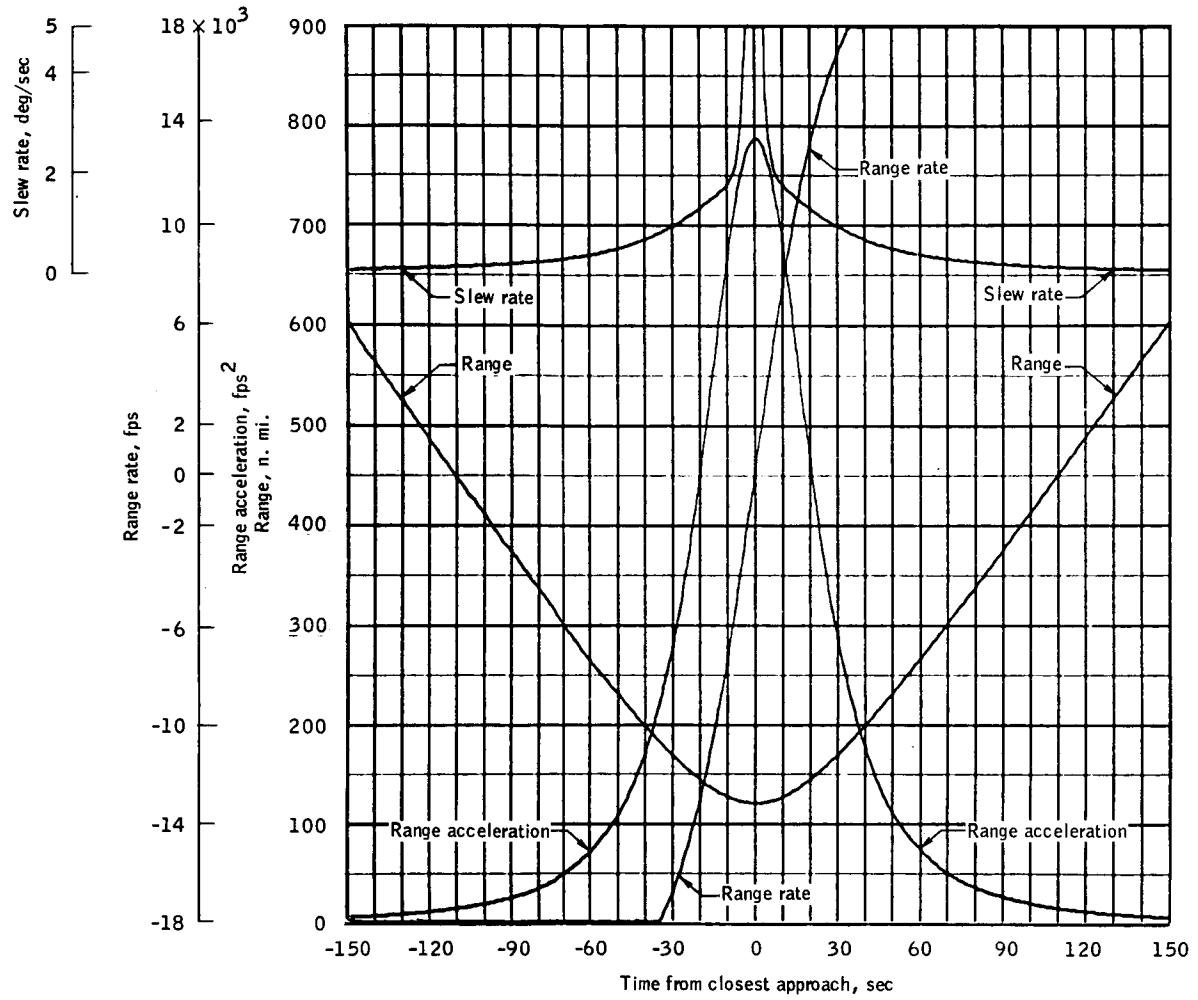
(dd) Revolution 89.

Figure 2.- Continued.



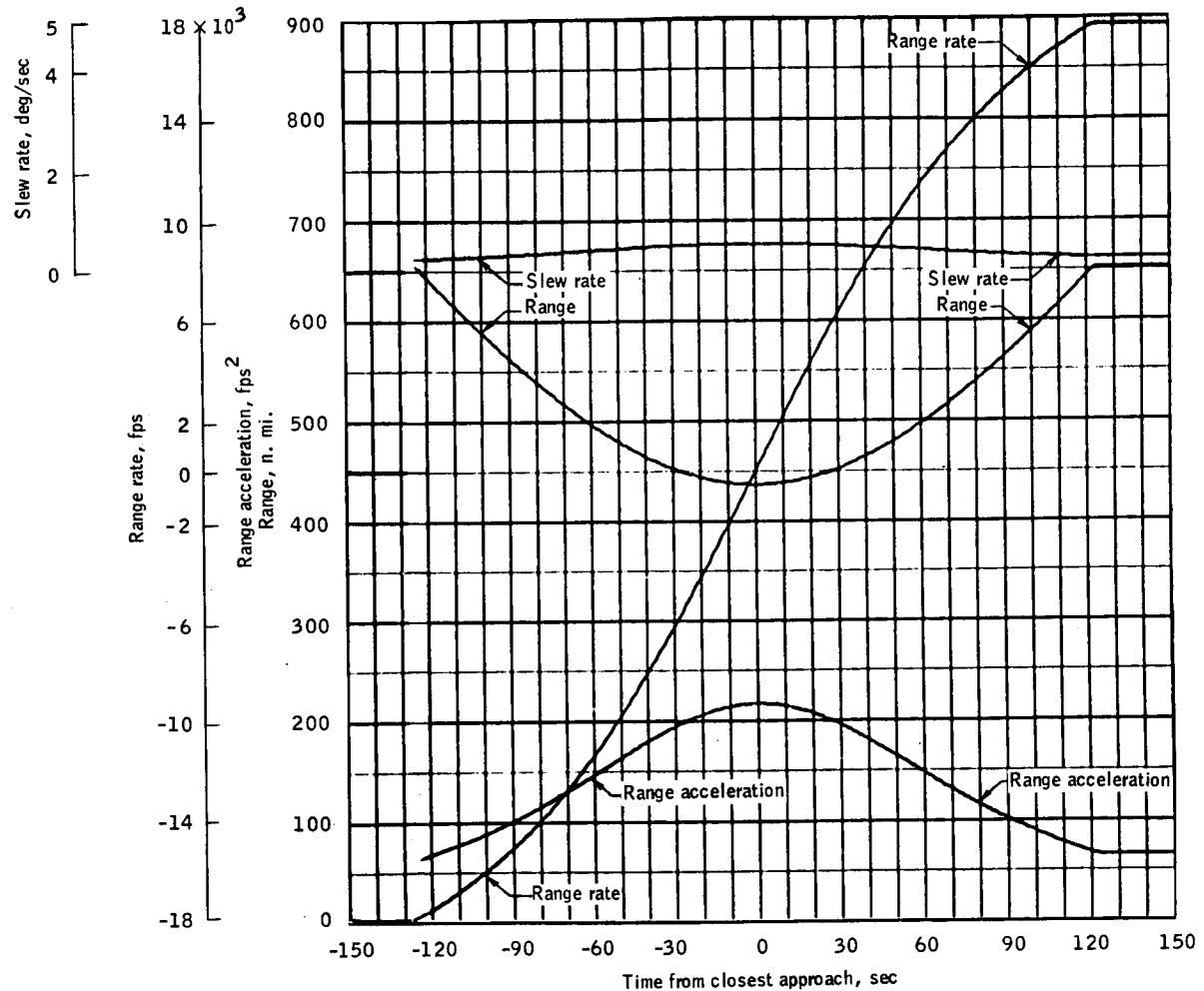
(ee) Revolution 90.

Figure 2.- Continued.



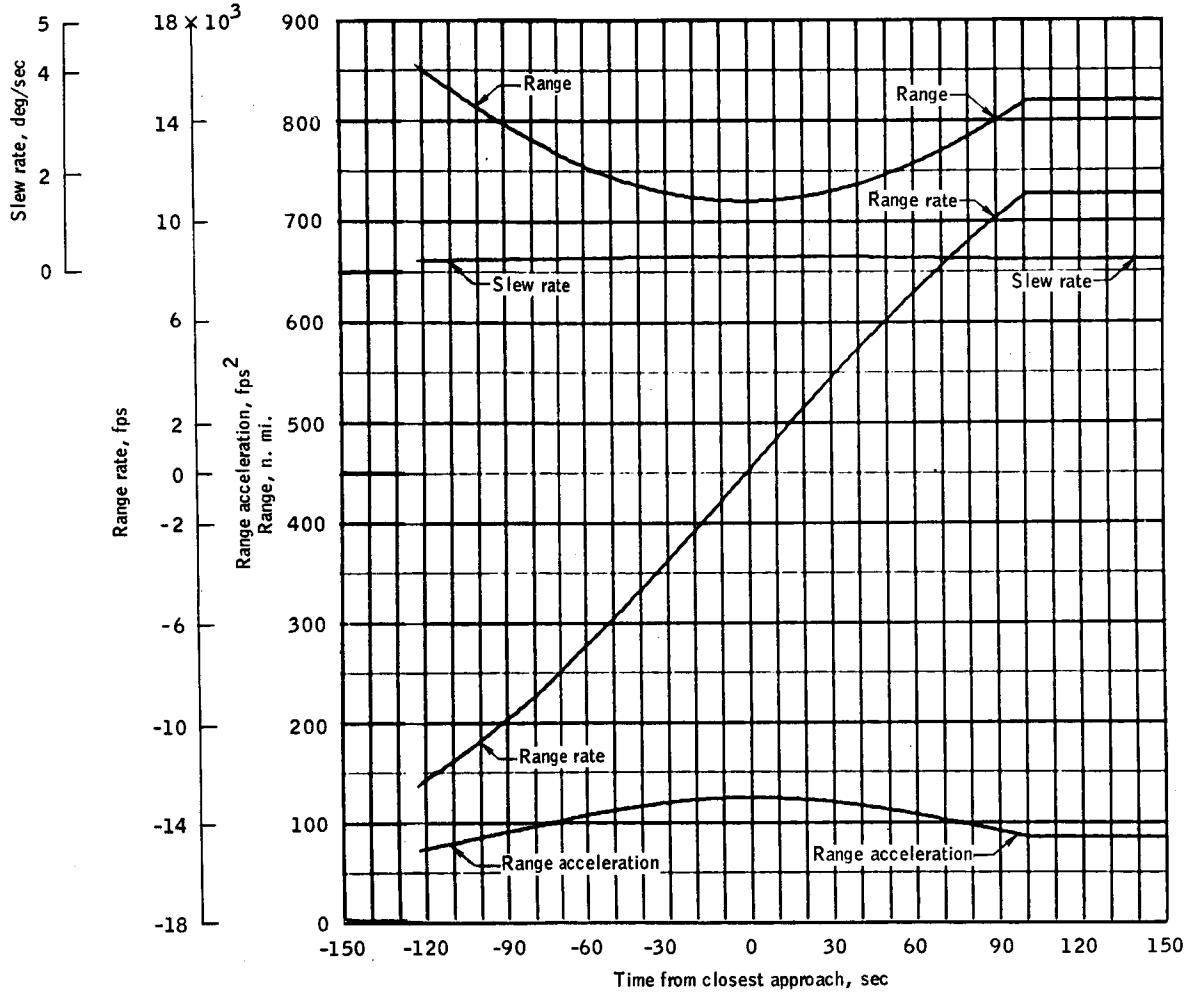
(ff) Revolution 91.

Figure 2.- Continued.



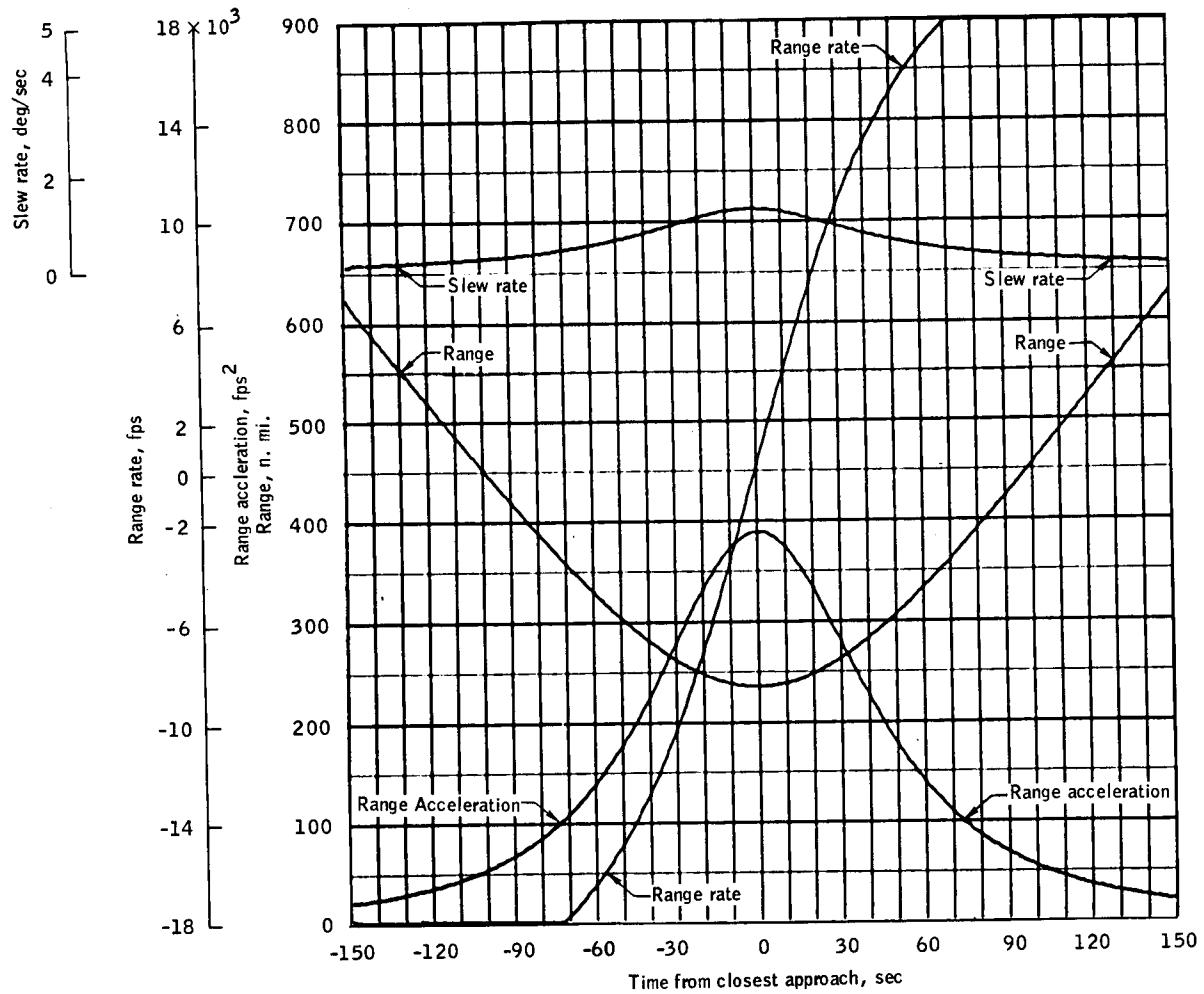
(gg) Revolution 92.

Figure 2.- Continued.



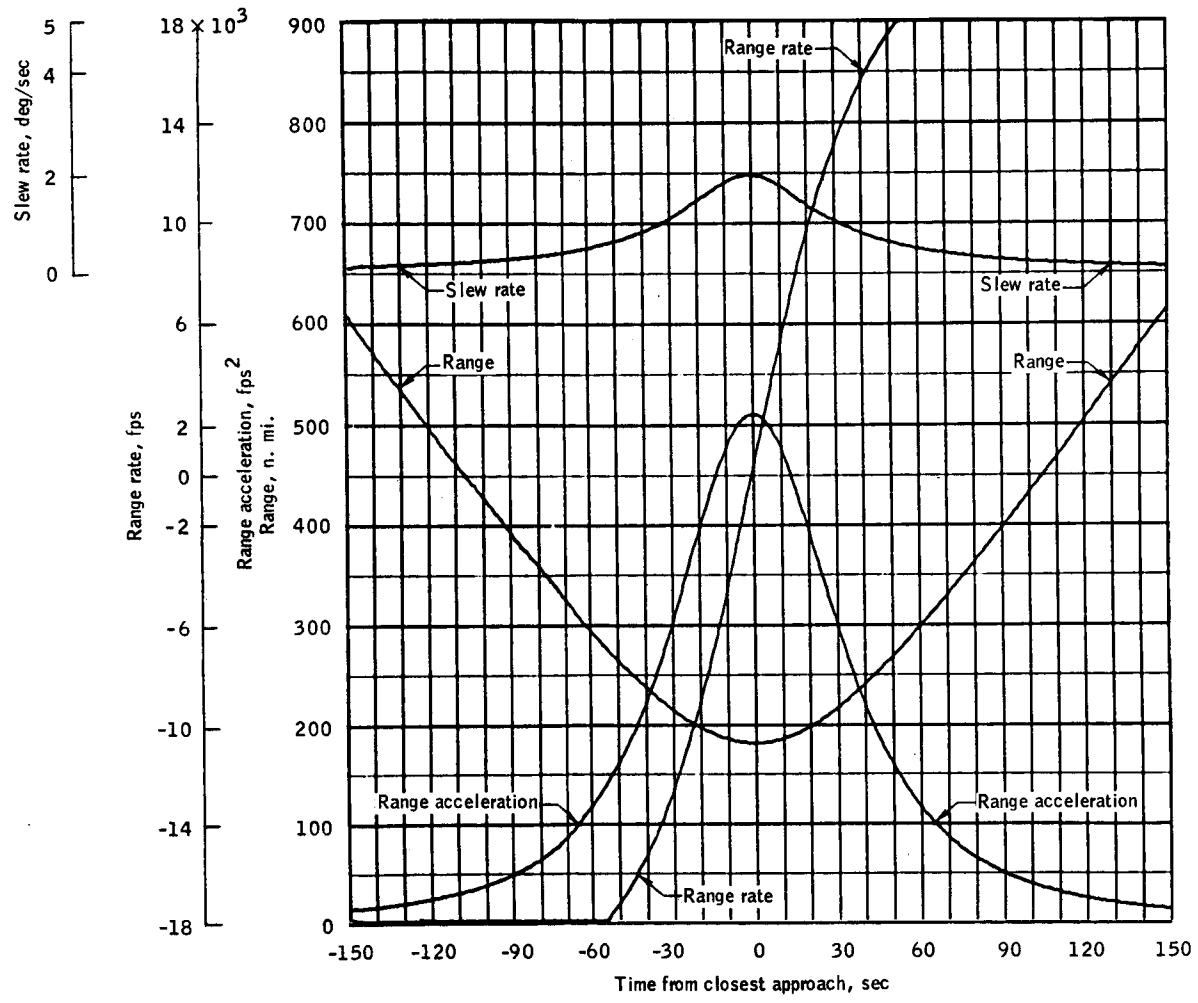
(hh) Revolution 102.

Figure 2.- Continued.



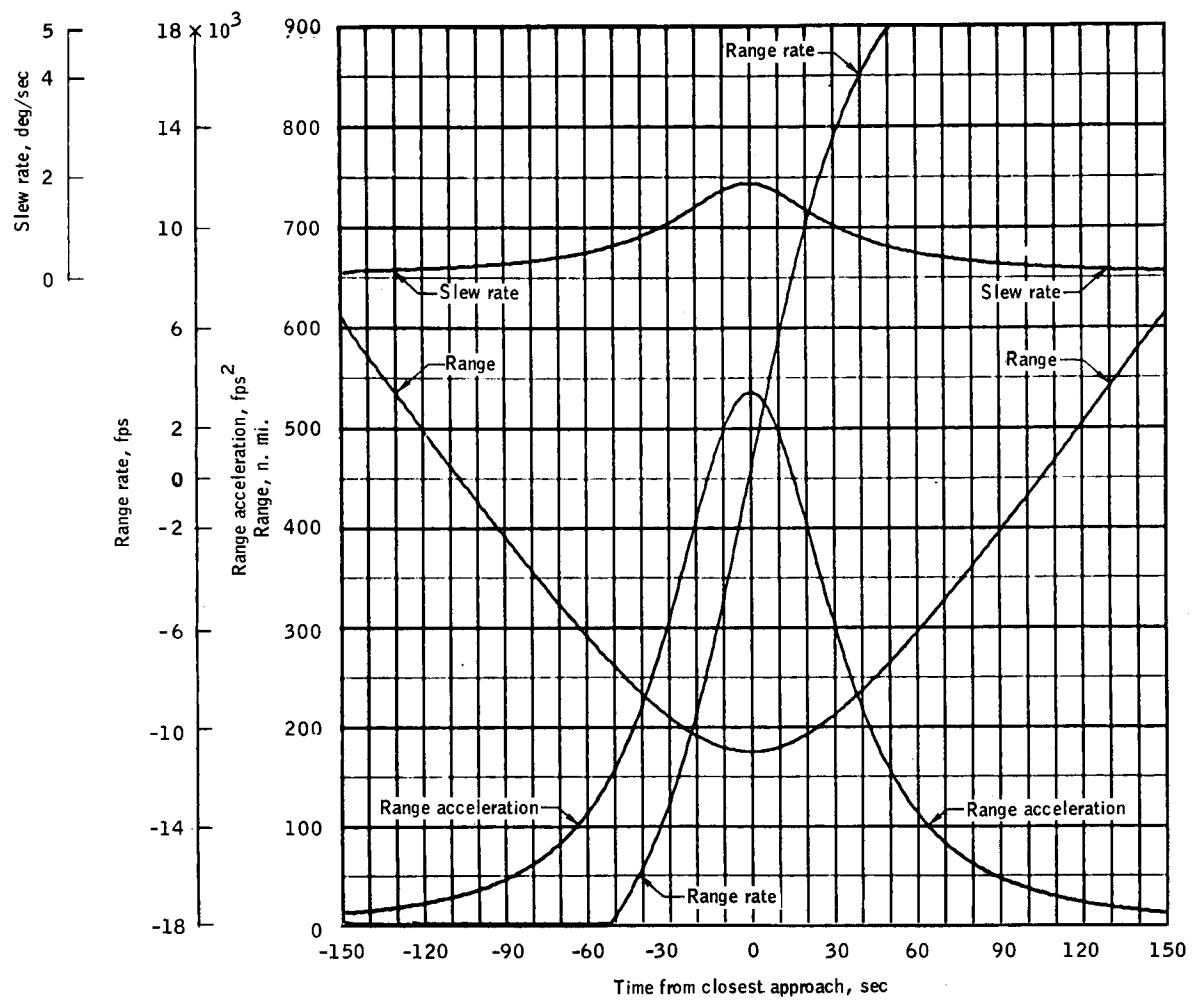
(ii) Revolution 103.

Figure 2.- Continued.



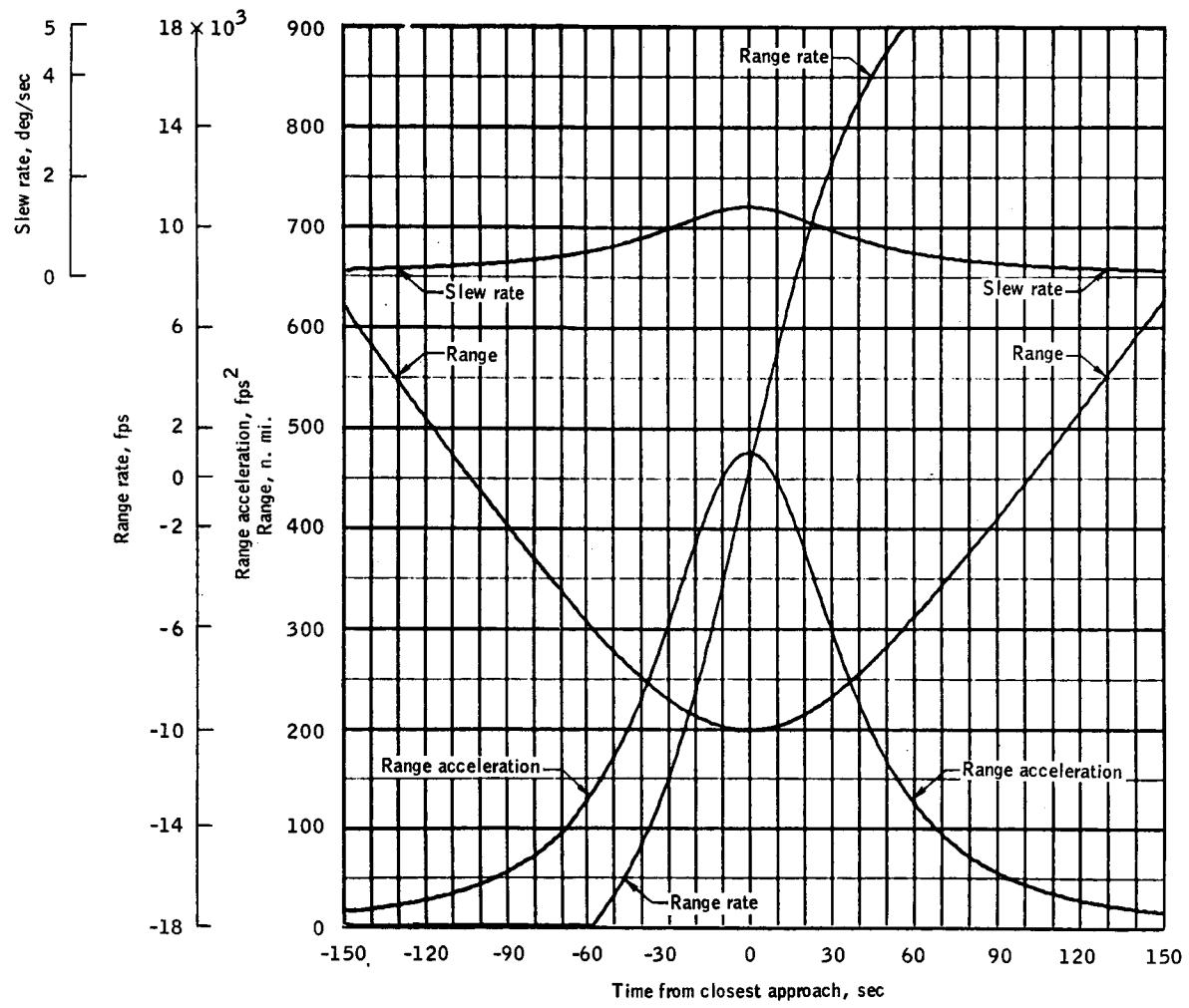
(jj) Revolution 104.

Figure 2.- Continued.



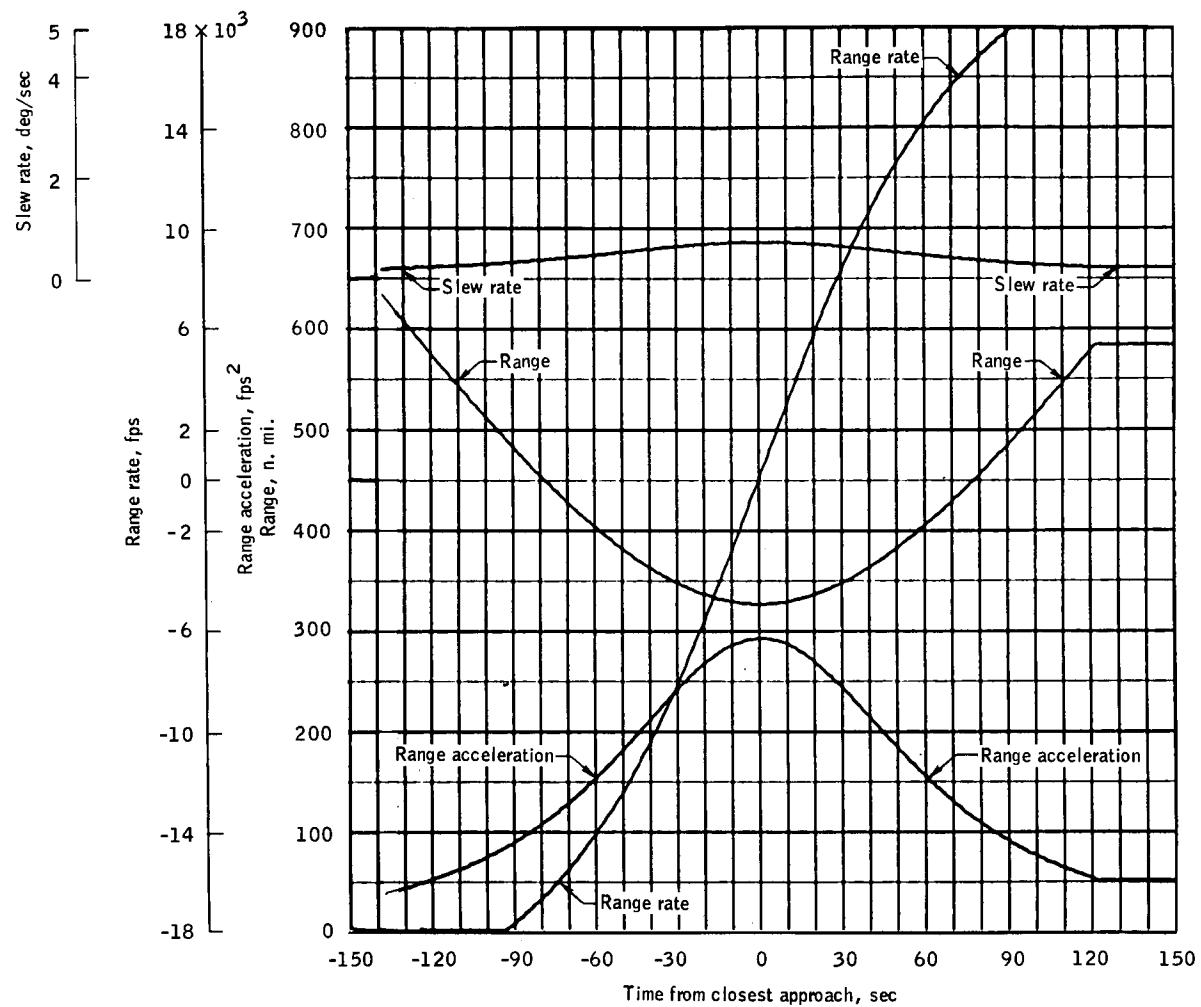
(kk) Revolution 105.

Figure 2.- Continued.



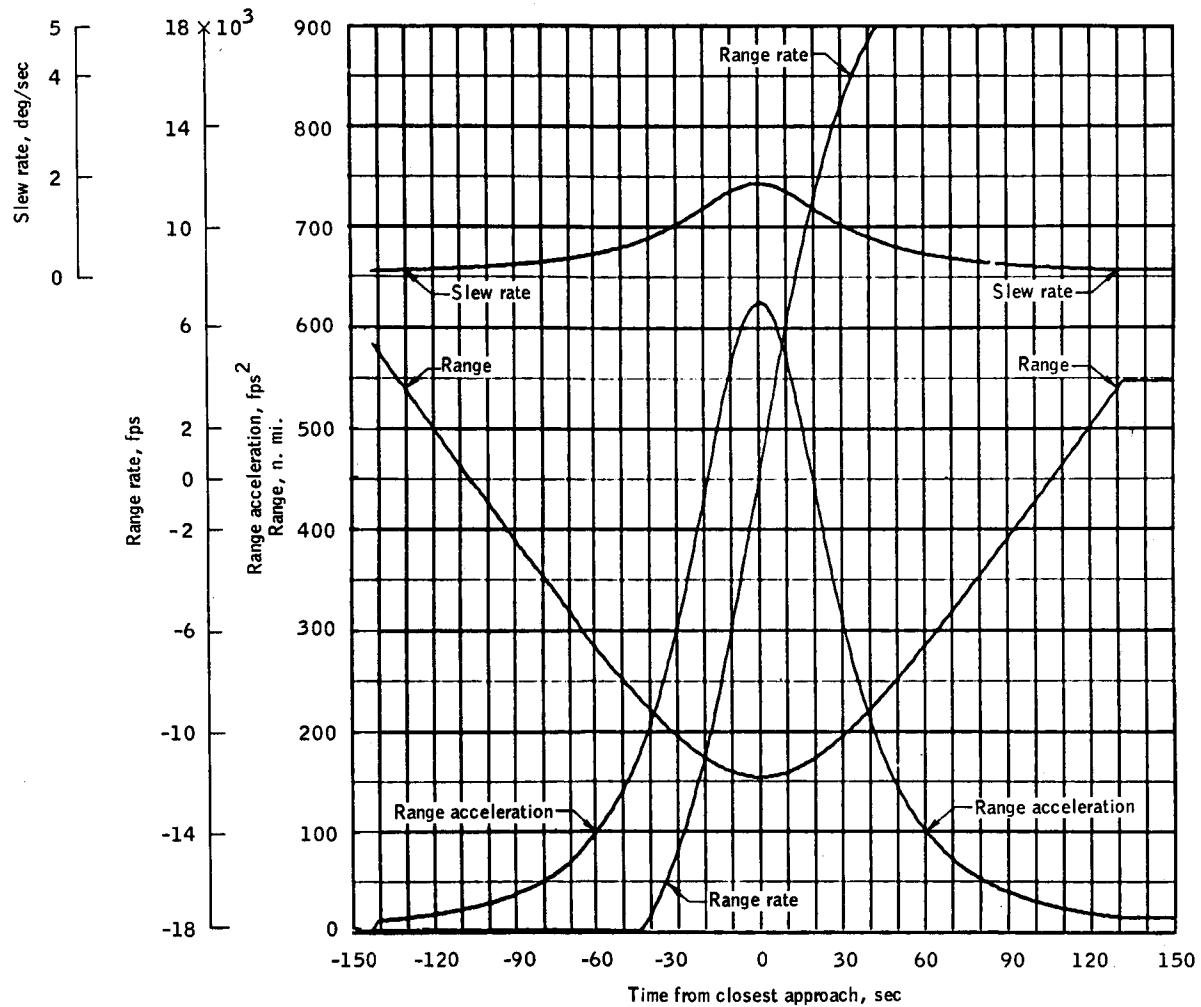
(II) Revolution 106.

Figure 2.- Continued.



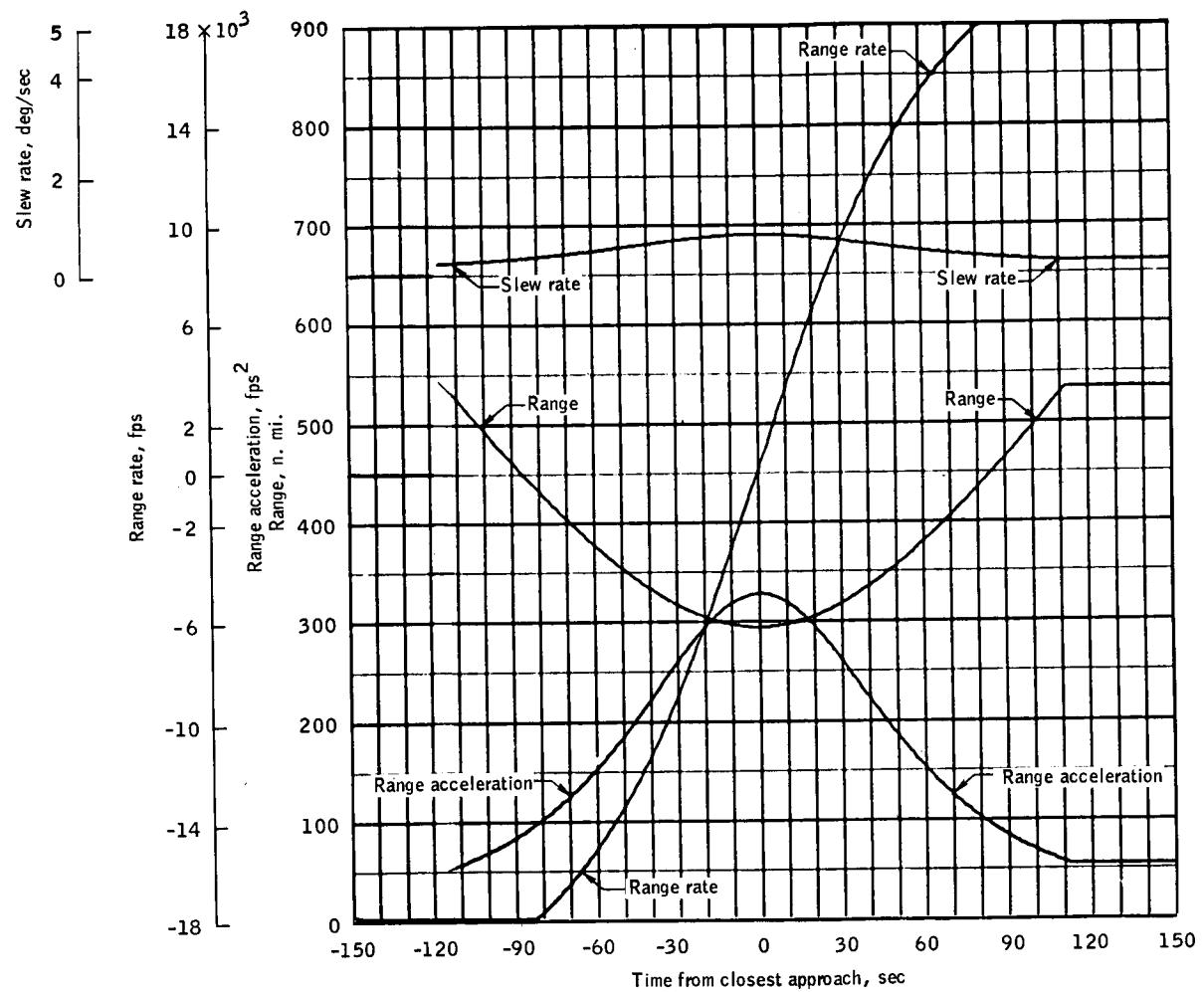
(mm) Revolution 117.

Figure 2.- Continued.



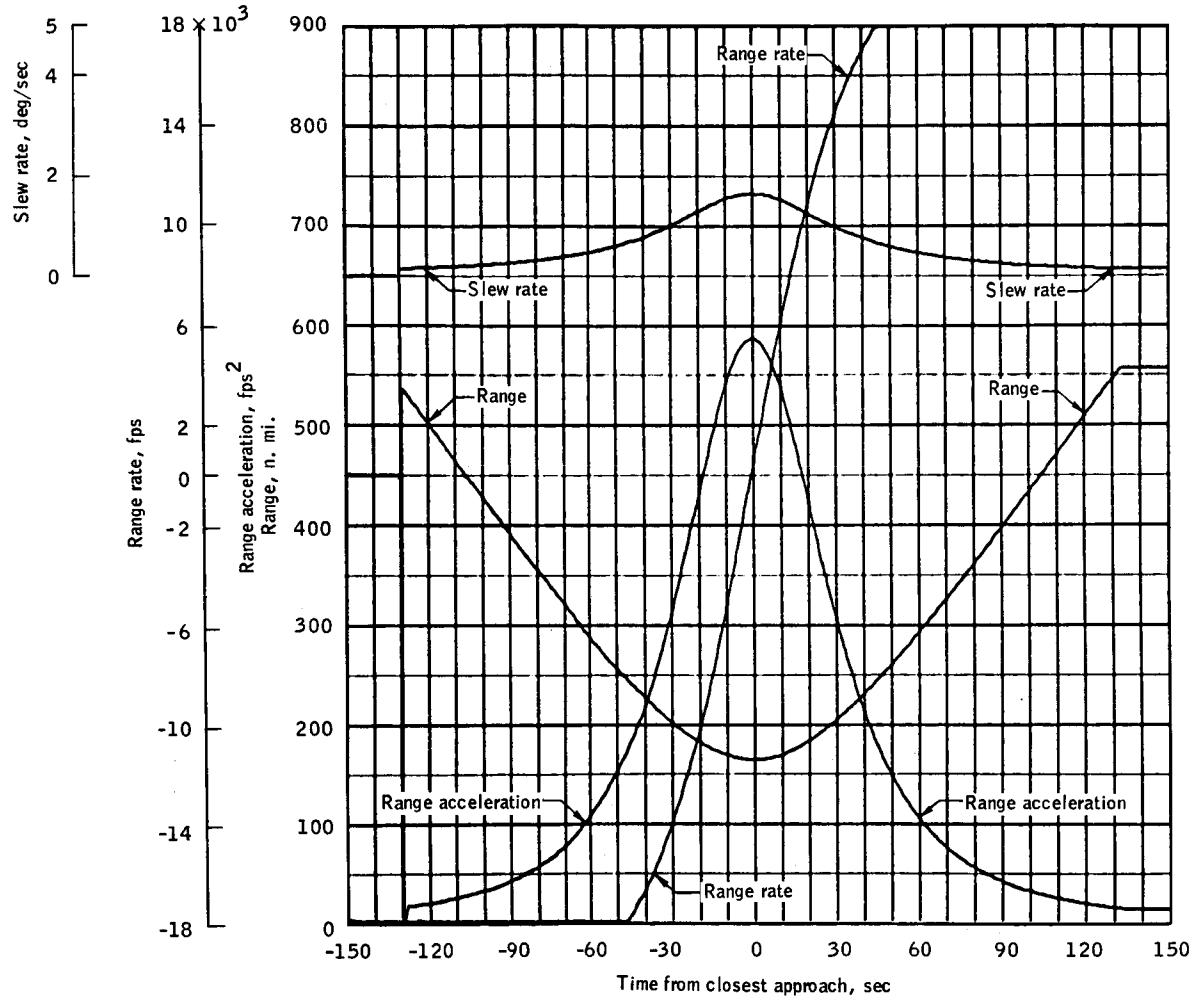
(nn) Revolution 118.

Figure 2.- Continued.



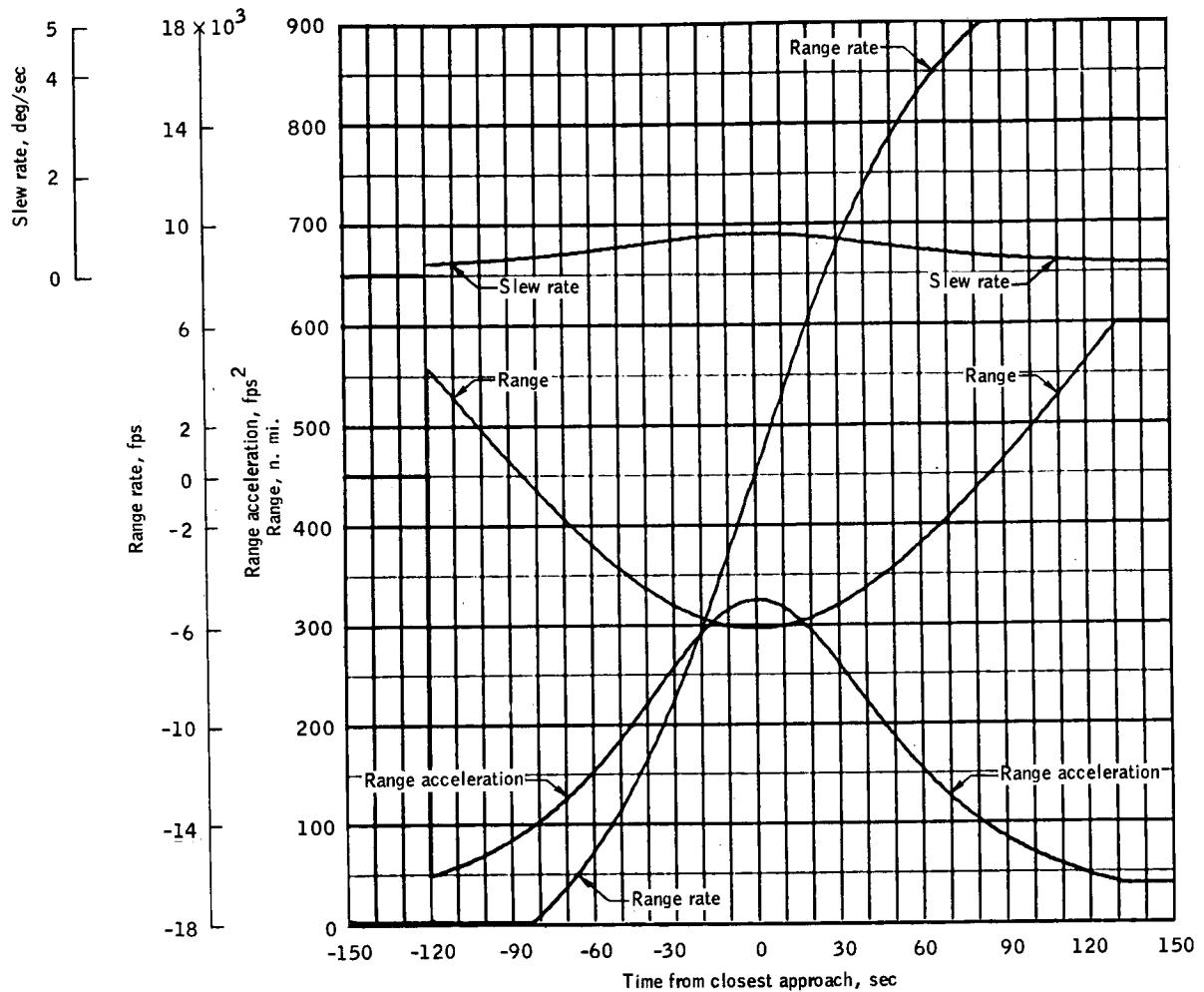
(oo) Revolution 119.

Figure 2.- Continued.



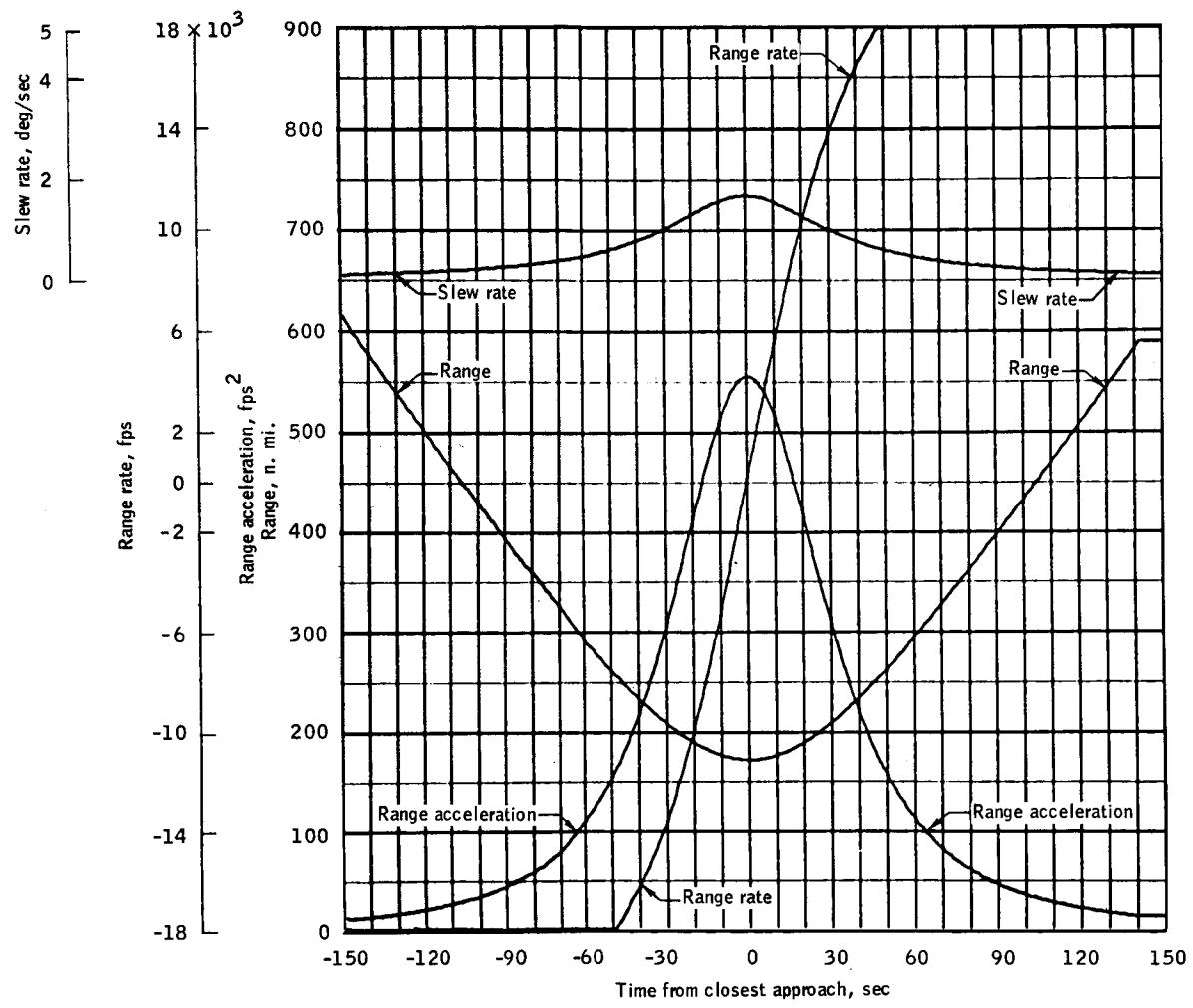
(pp) Revolution 120.

Figure 2. - Continued.



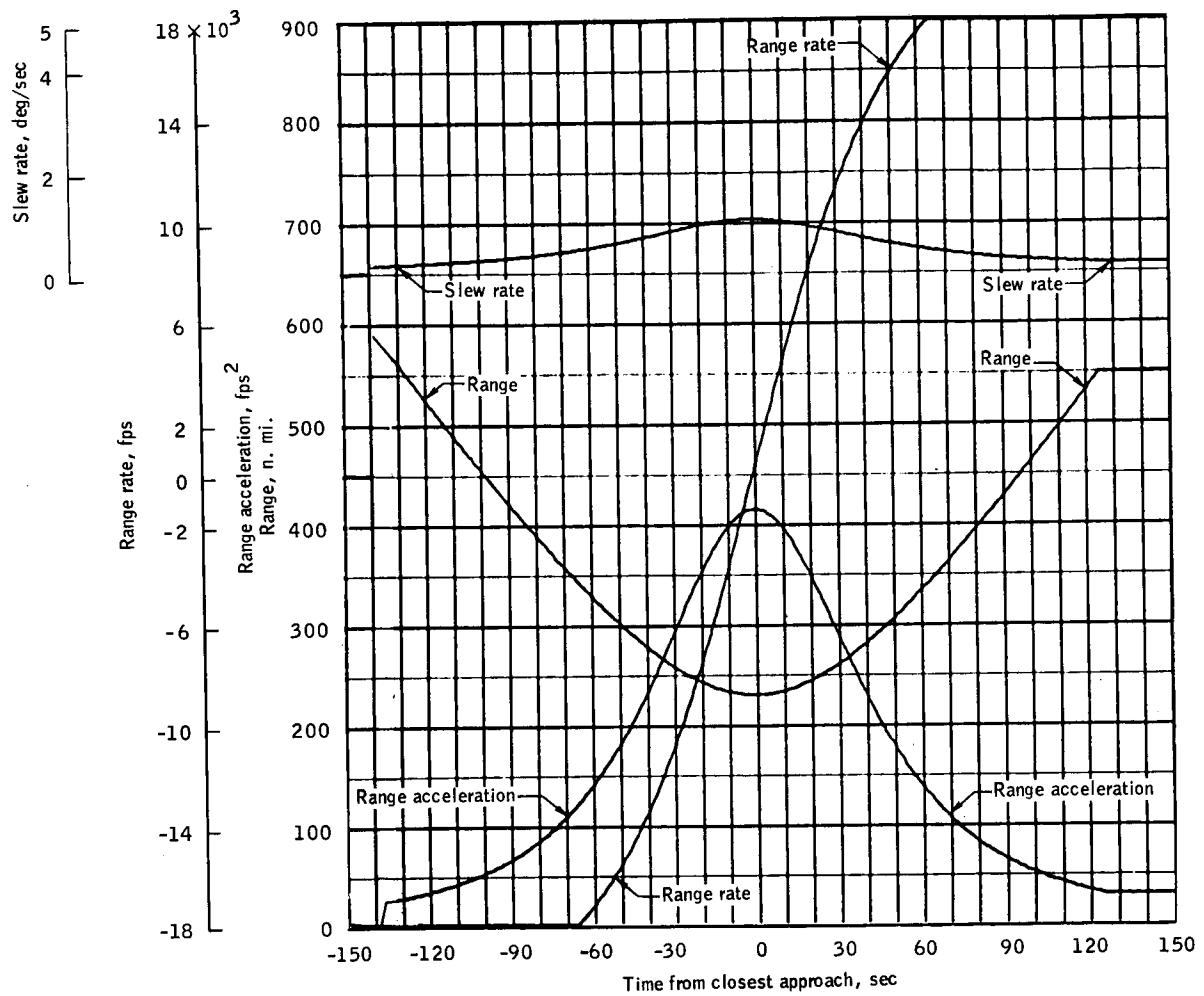
(qq) Revolution 121.

Figure 2.- Continued.



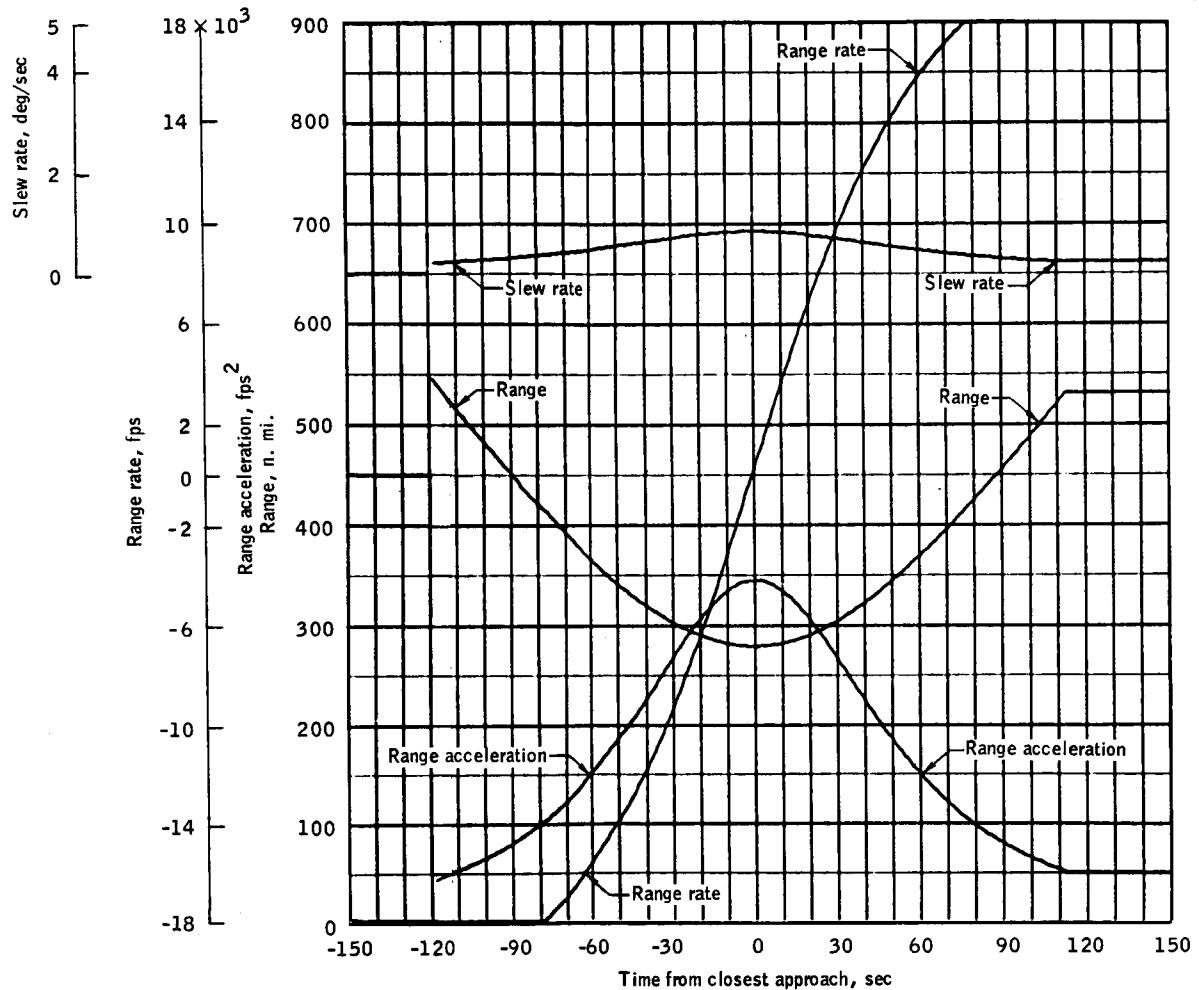
(rr) Revolution 132.

Figure 2.- Continued.



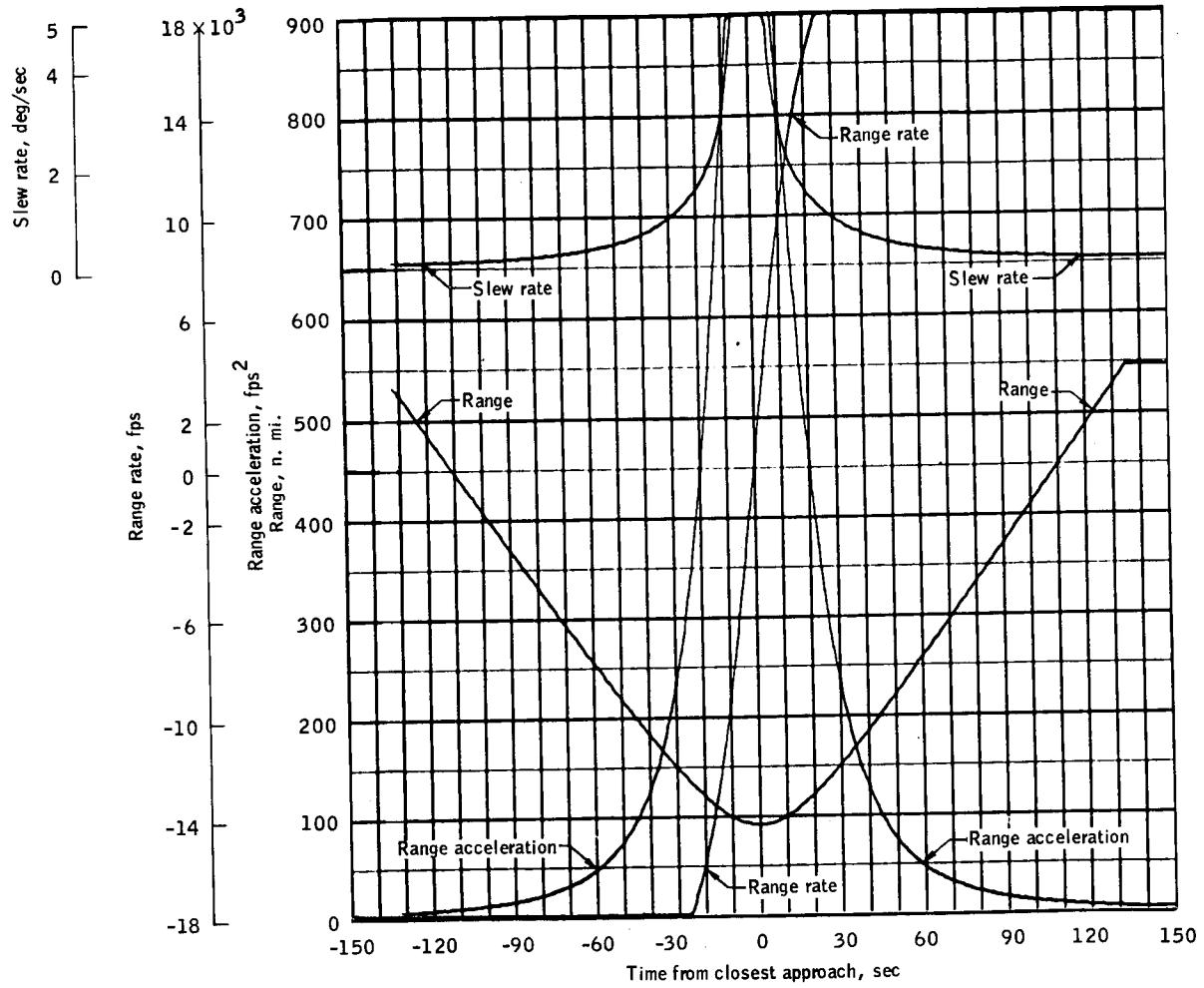
(ss) Revolution 133.

Figure 2.- Continued.



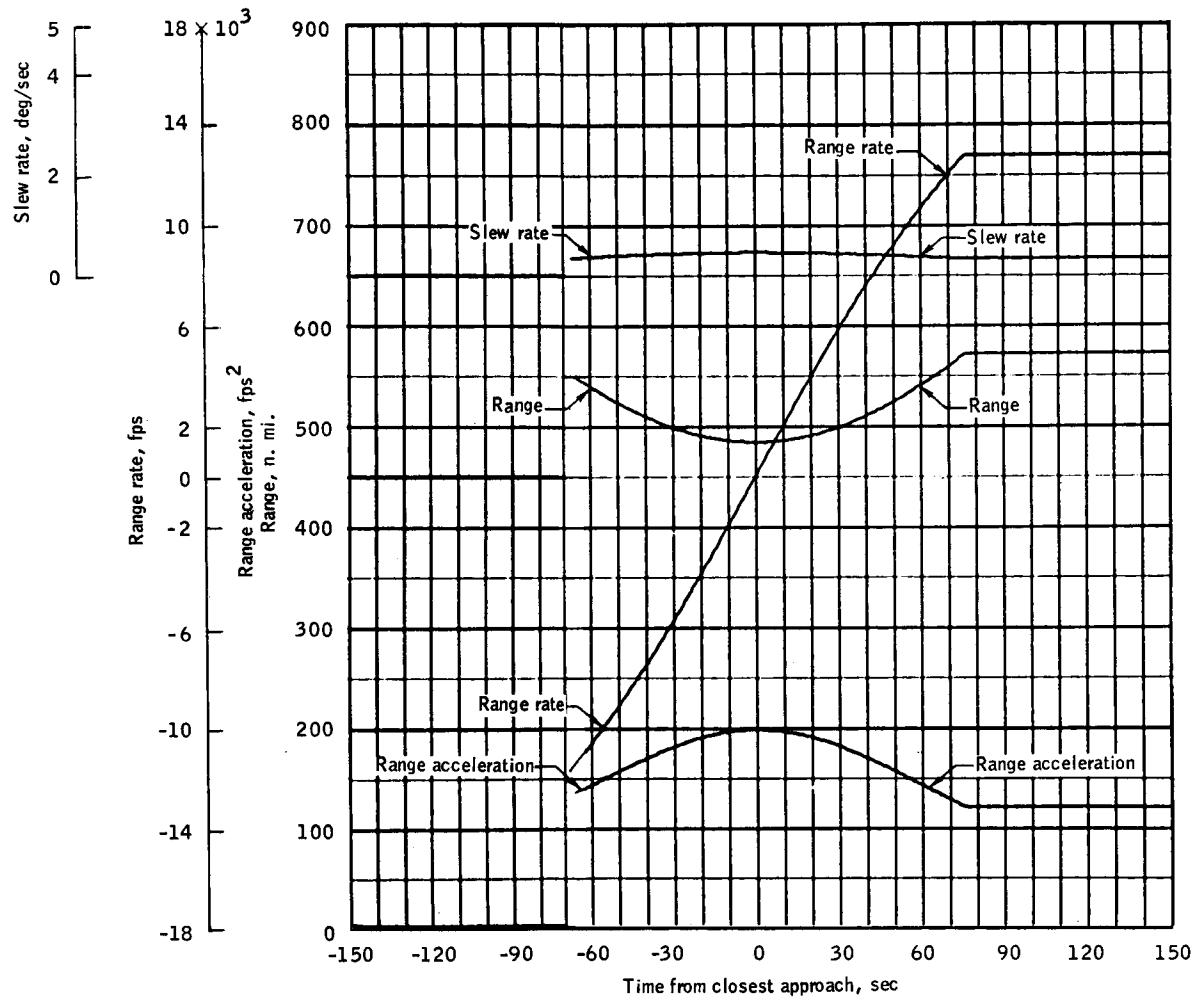
(tt) Revolution 134.

Figure 2.- Continued.



(uu) Revolution 135.

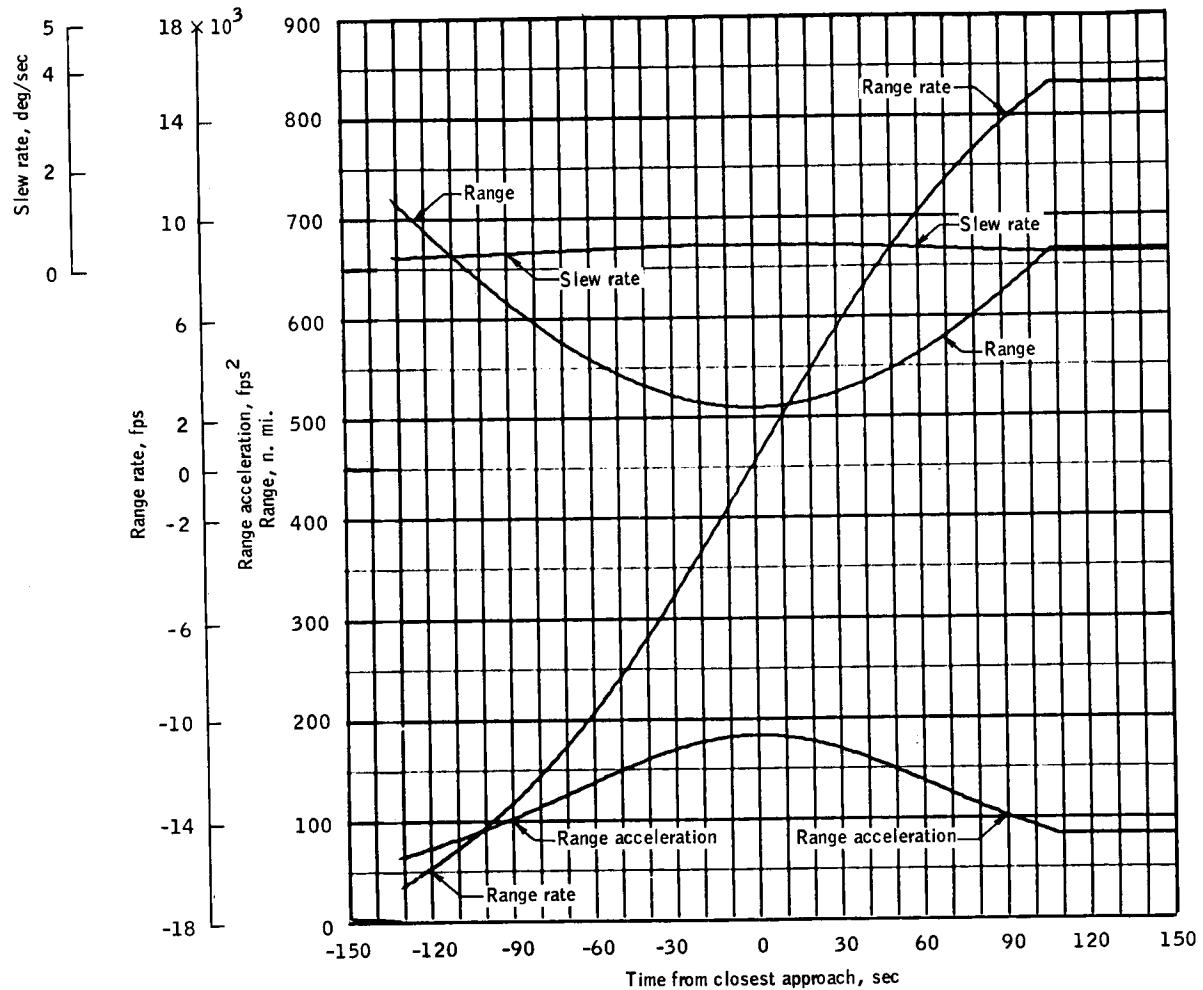
Figure 2.- Continued.



(vv) Revolution 136.

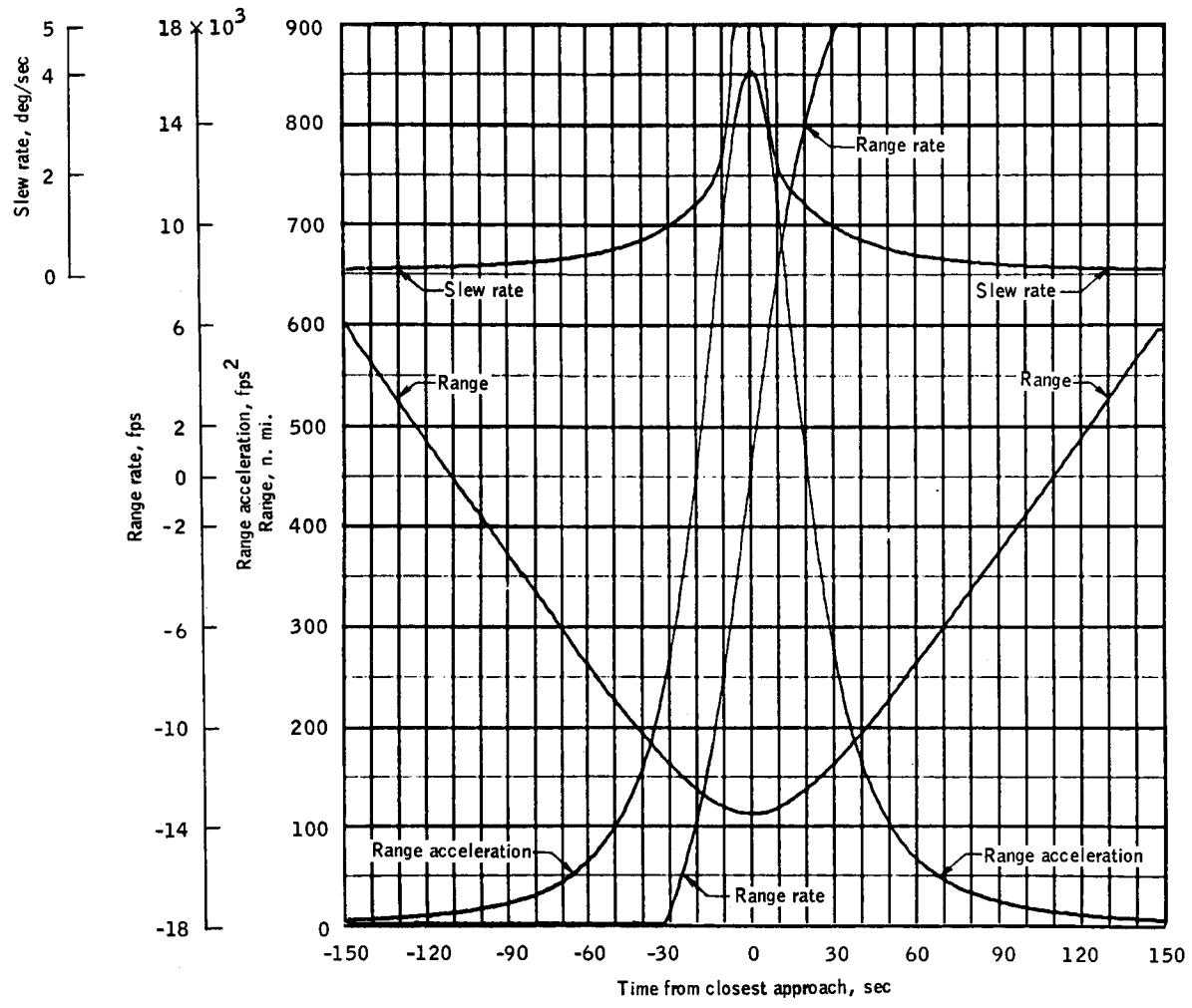
Figure 2.- Continued.

$\cdot 10^4$



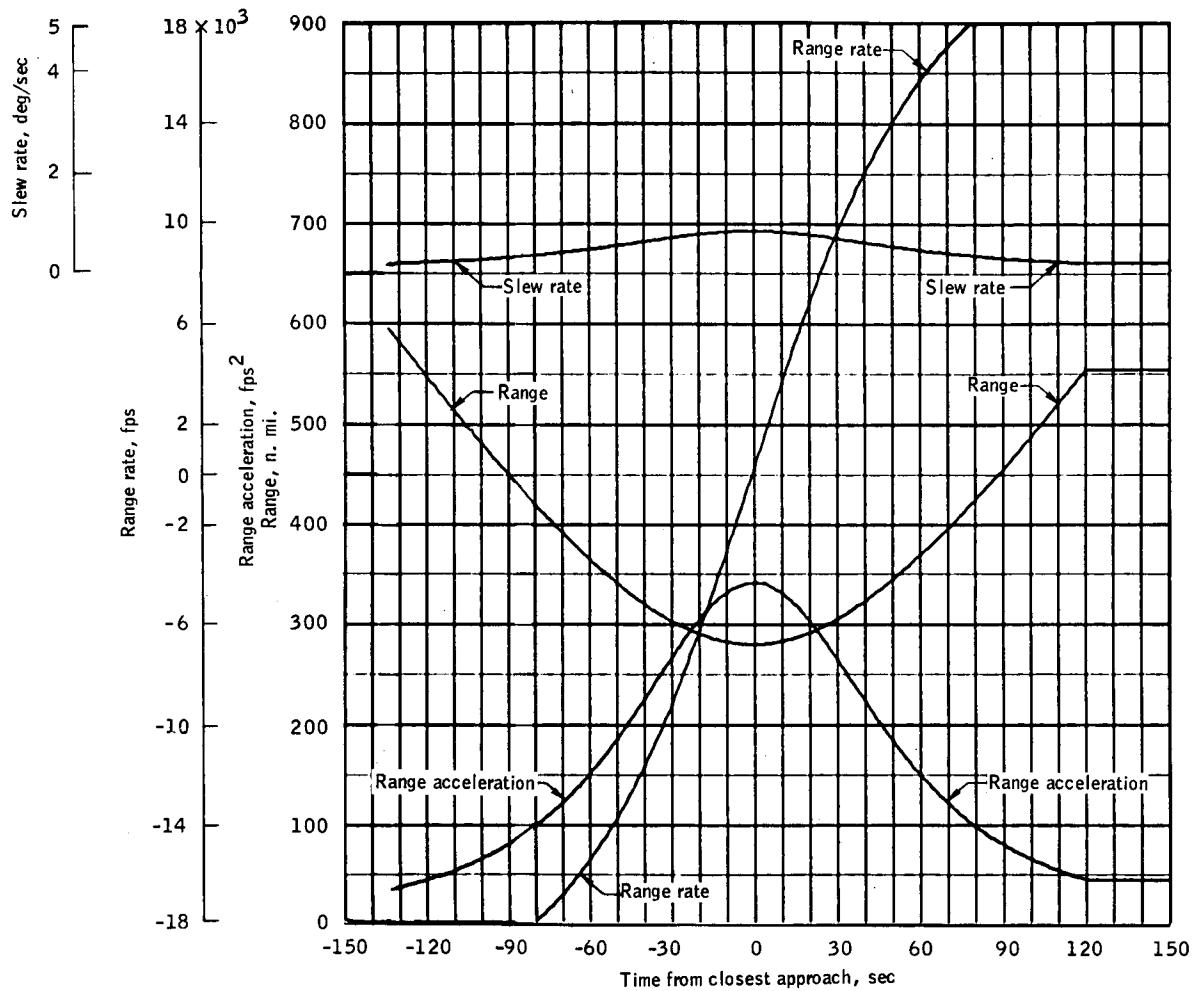
(ww) Revolution 146.

Figure 2. - Continued.



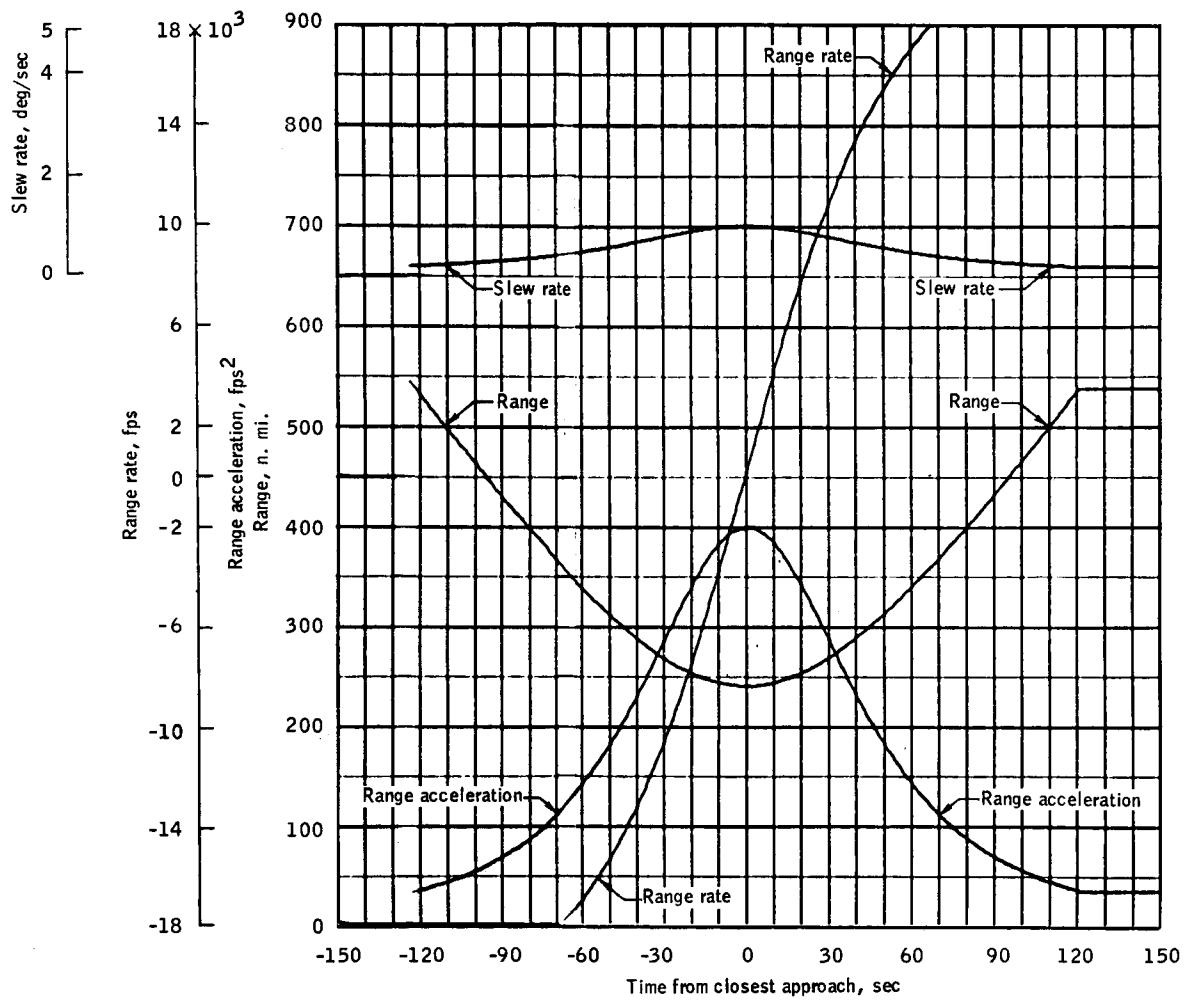
(xx) Revolution 147.

Figure 2.- Continued.



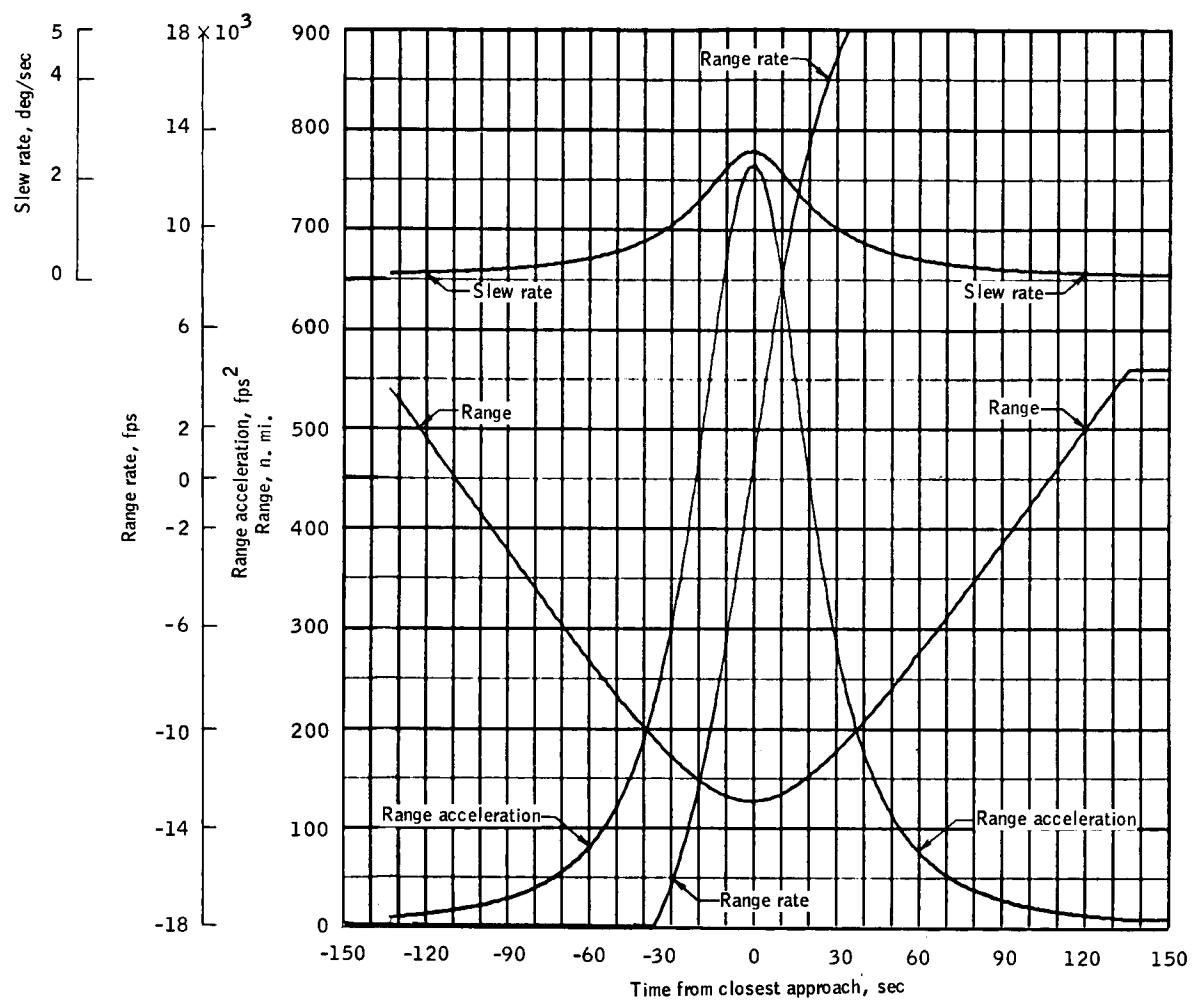
(yy) Revolution 148.

Figure 2.- Continued.



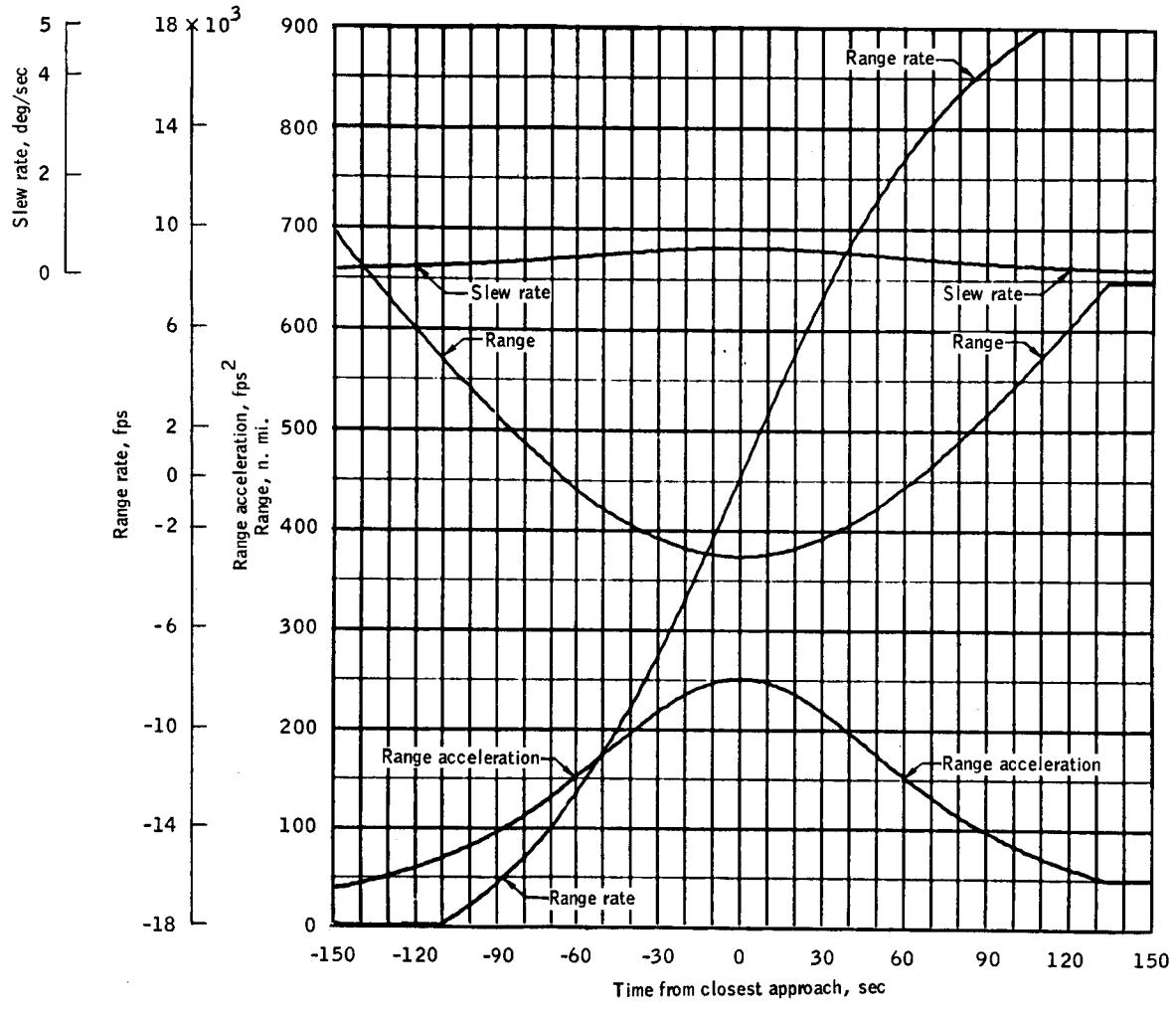
(zz) Revolution 149.

Figure 2.- Continued.



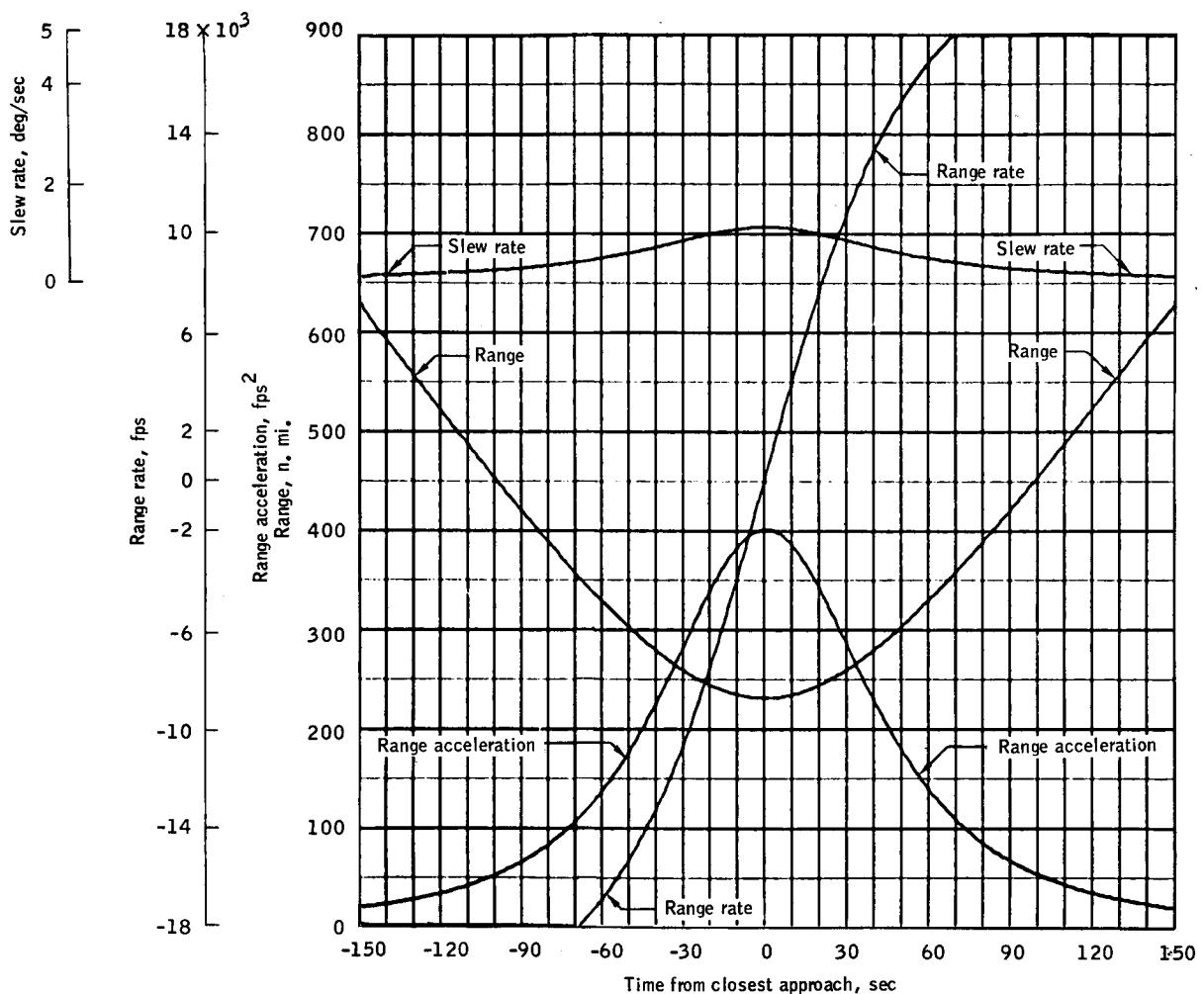
(aaa) Revolution 150.

Figure 2. - Continued.



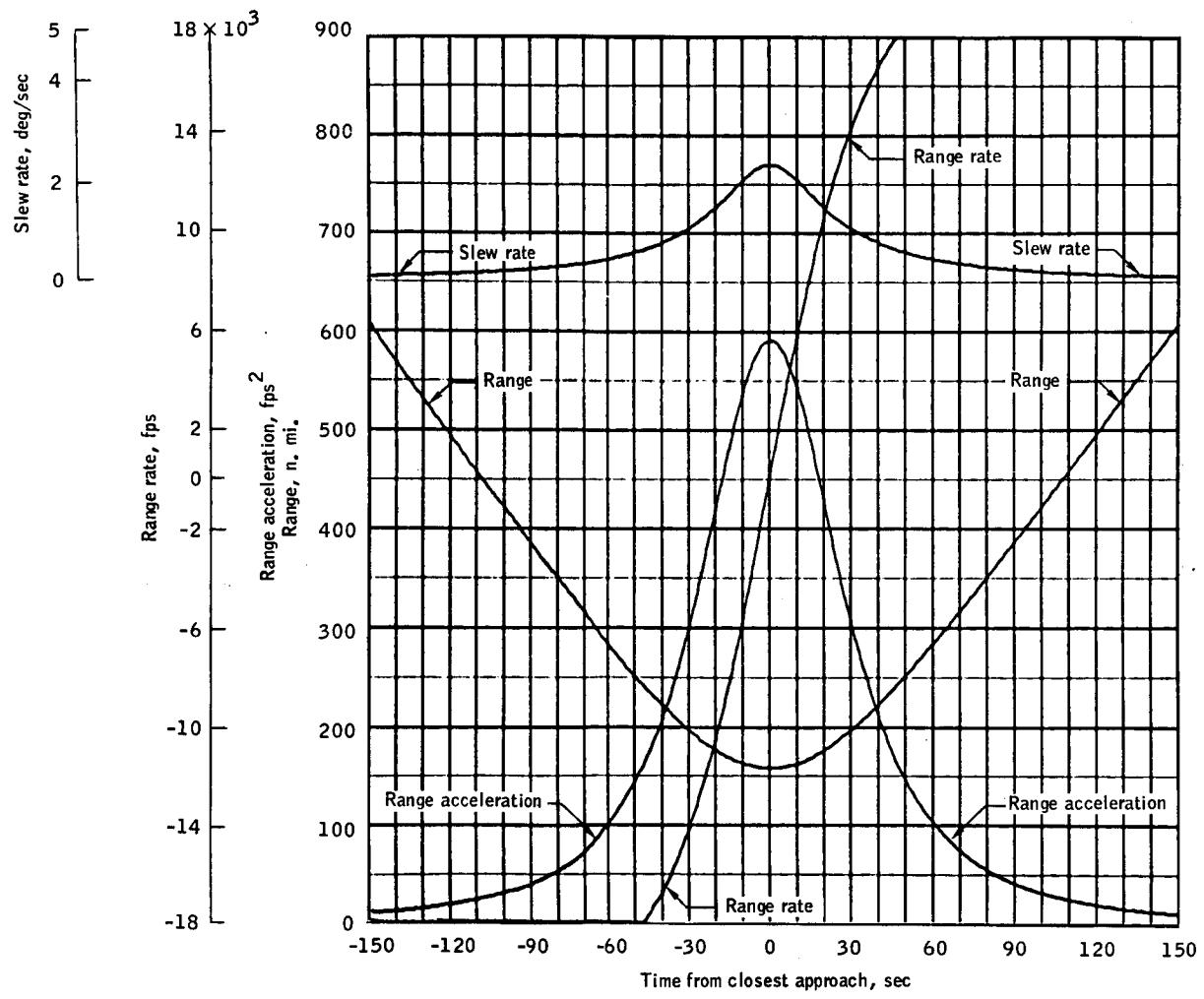
(bbb) Revolution 162.

Figure 2.- Concluded.



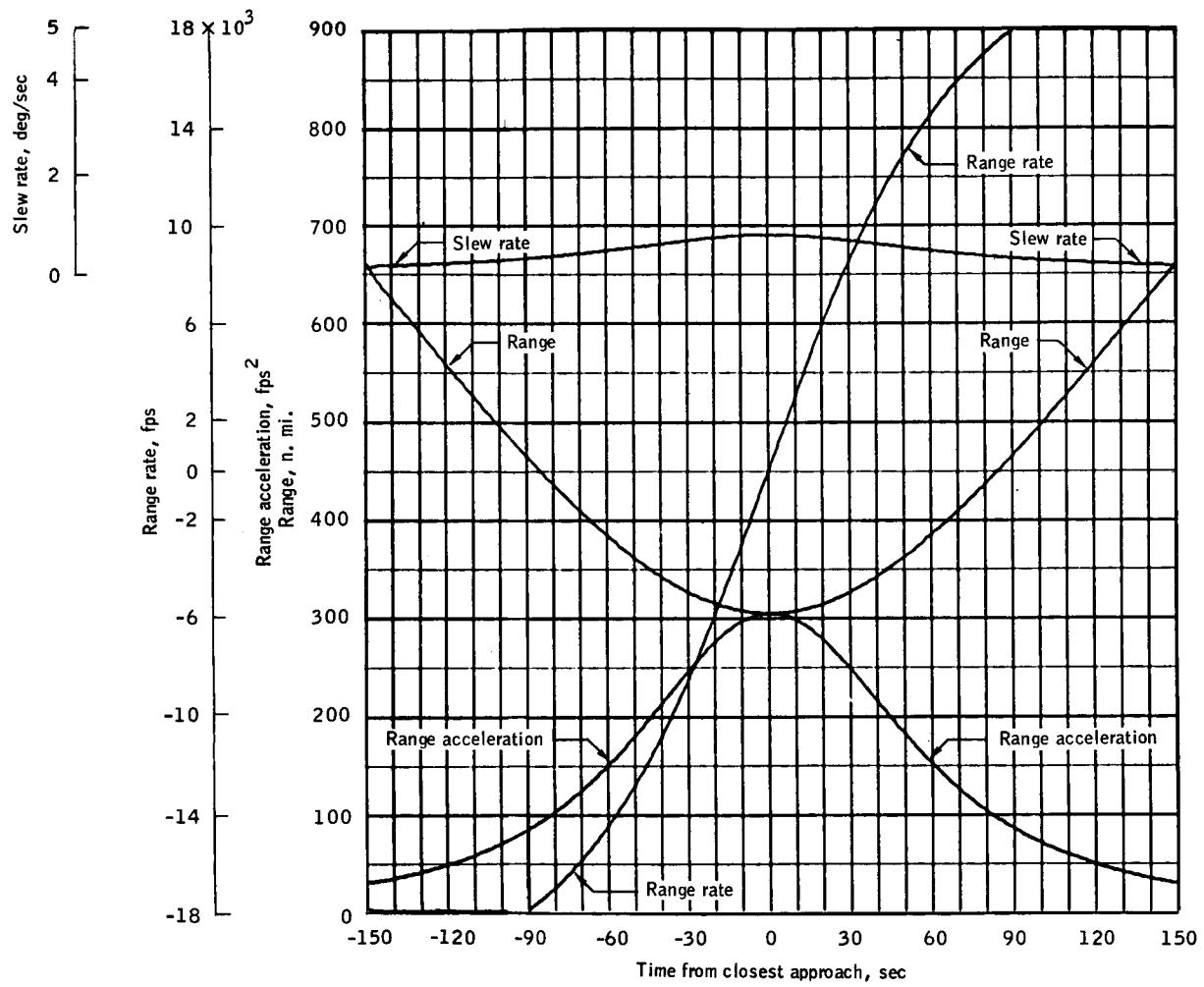
(a) Revolution 2.

Figure 3.- Radar data for Cape Kennedy based on the Mission C reference trajectory.



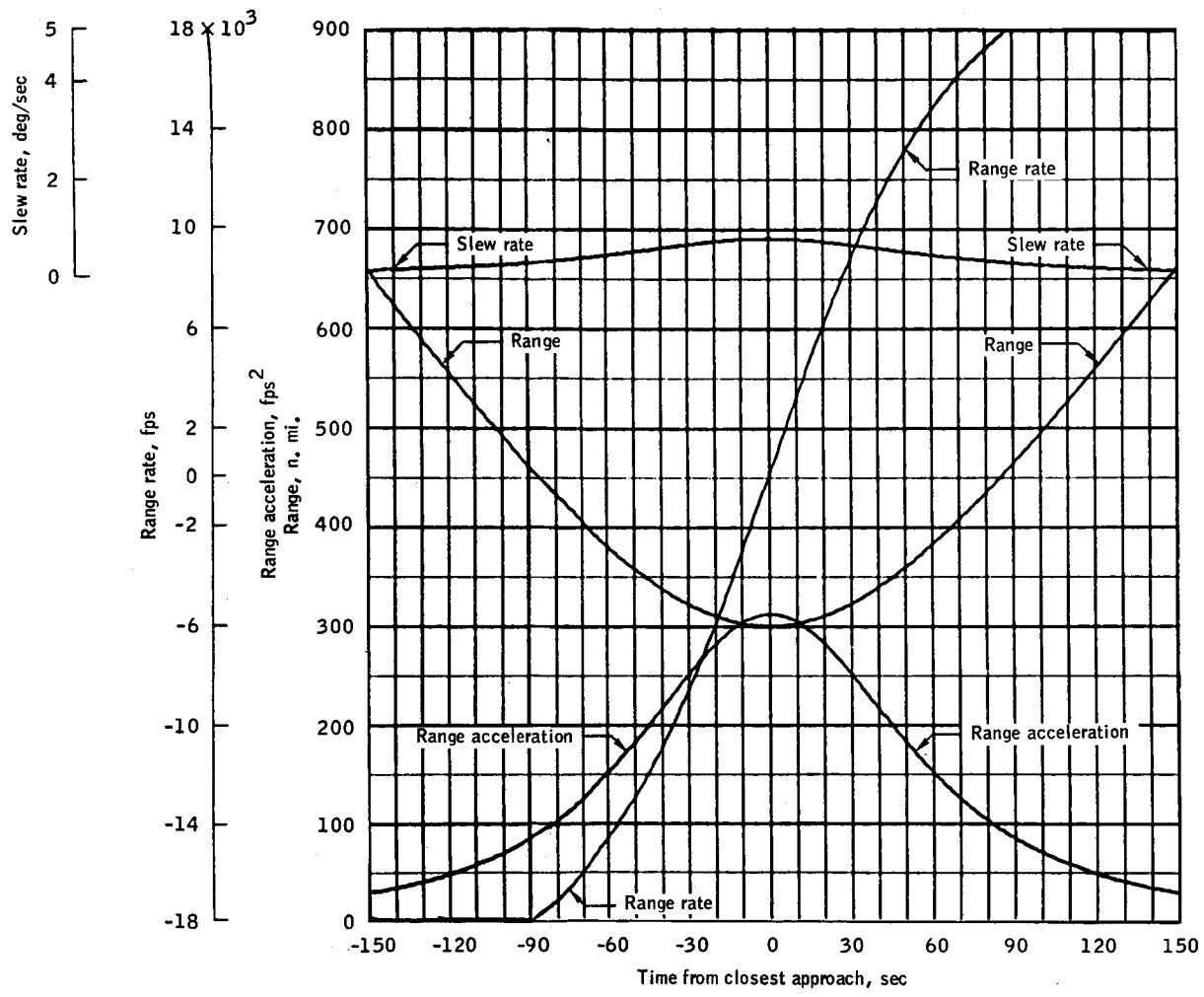
(b) Revolution 3.

Figure 3.- Continued.



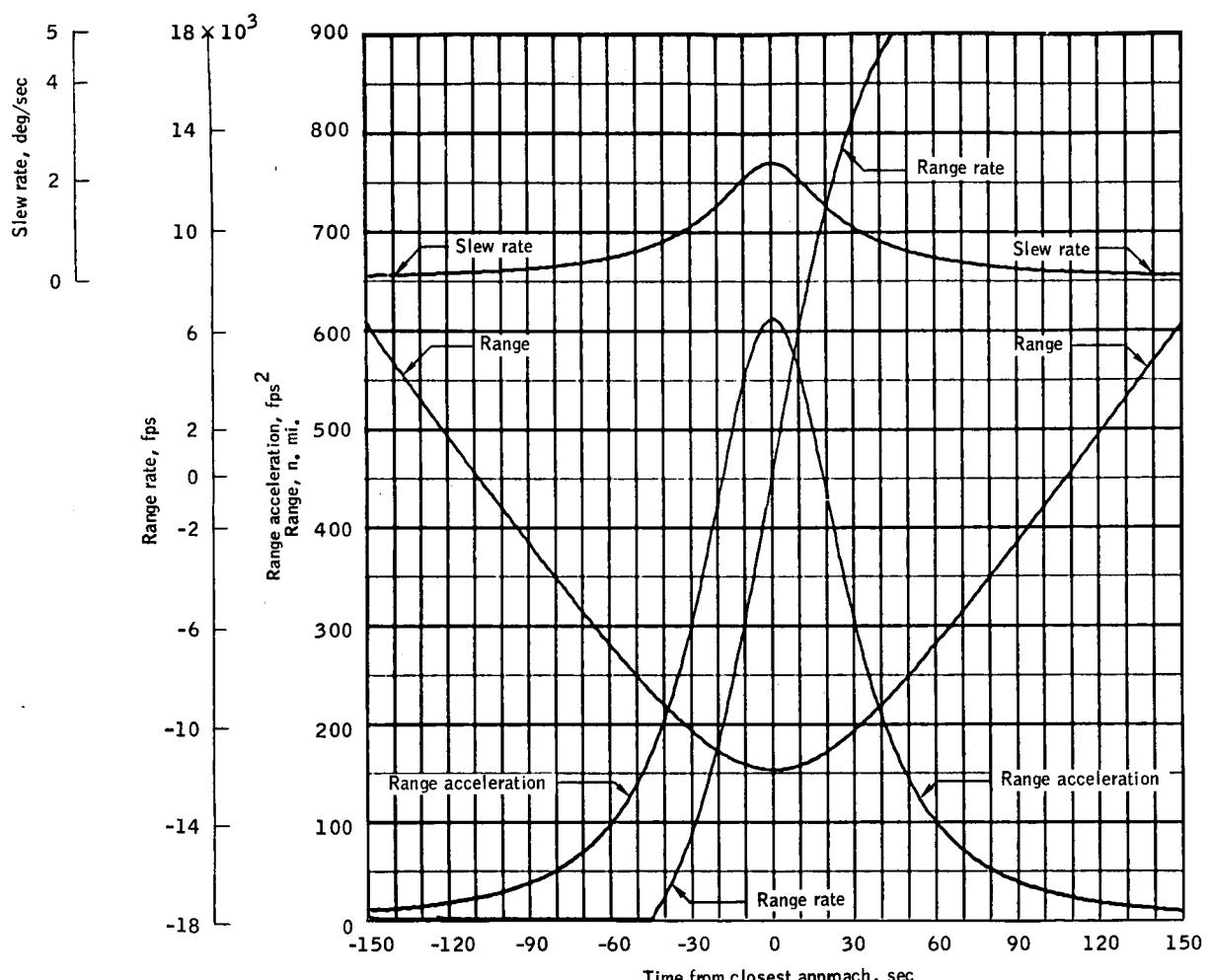
(c) Revolution 4.

Figure 3.- Continued.



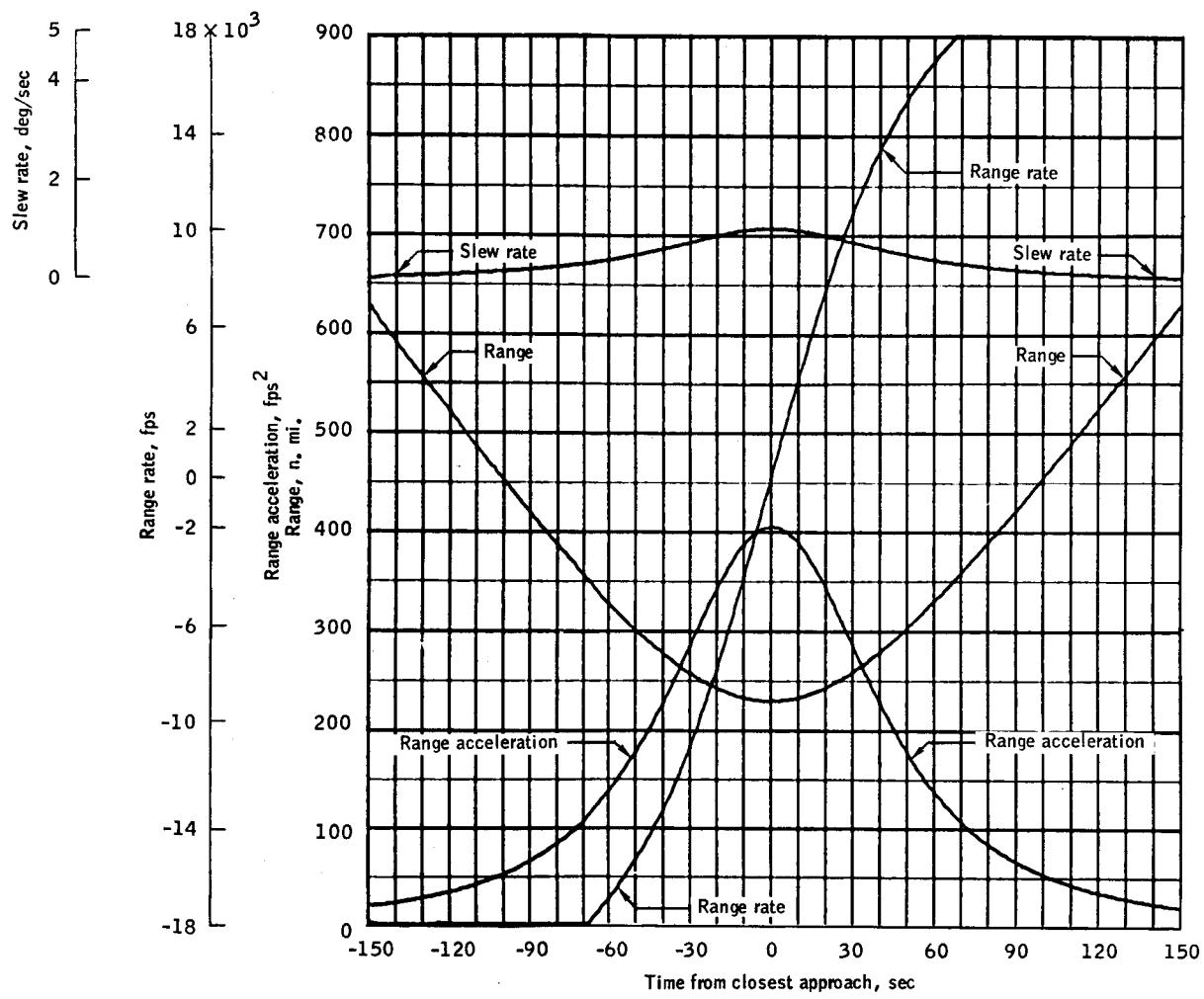
(d) Revolution 15.

Figure 3.- Continued.



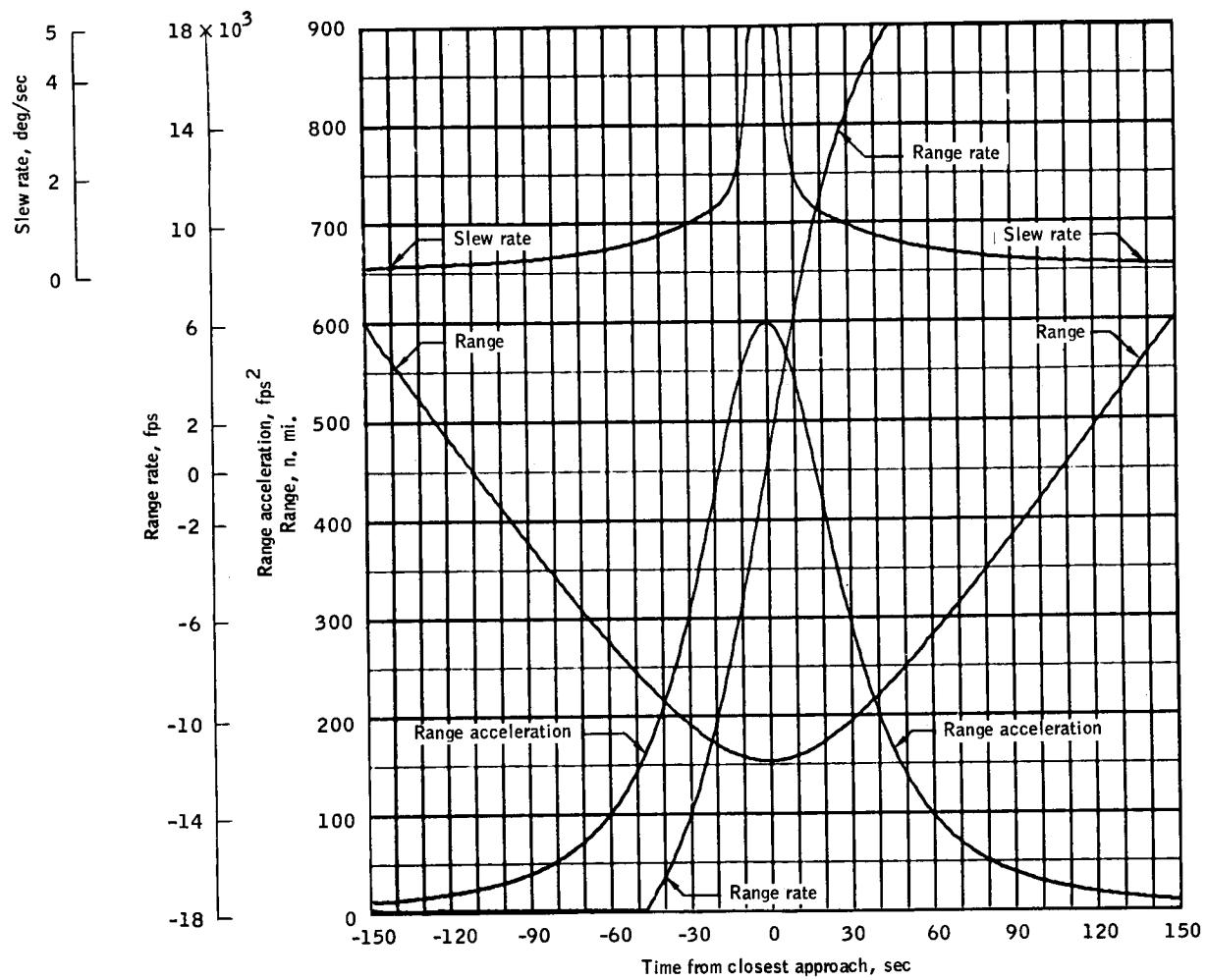
(e) Revolution 16.

Figure 3.- Continued.



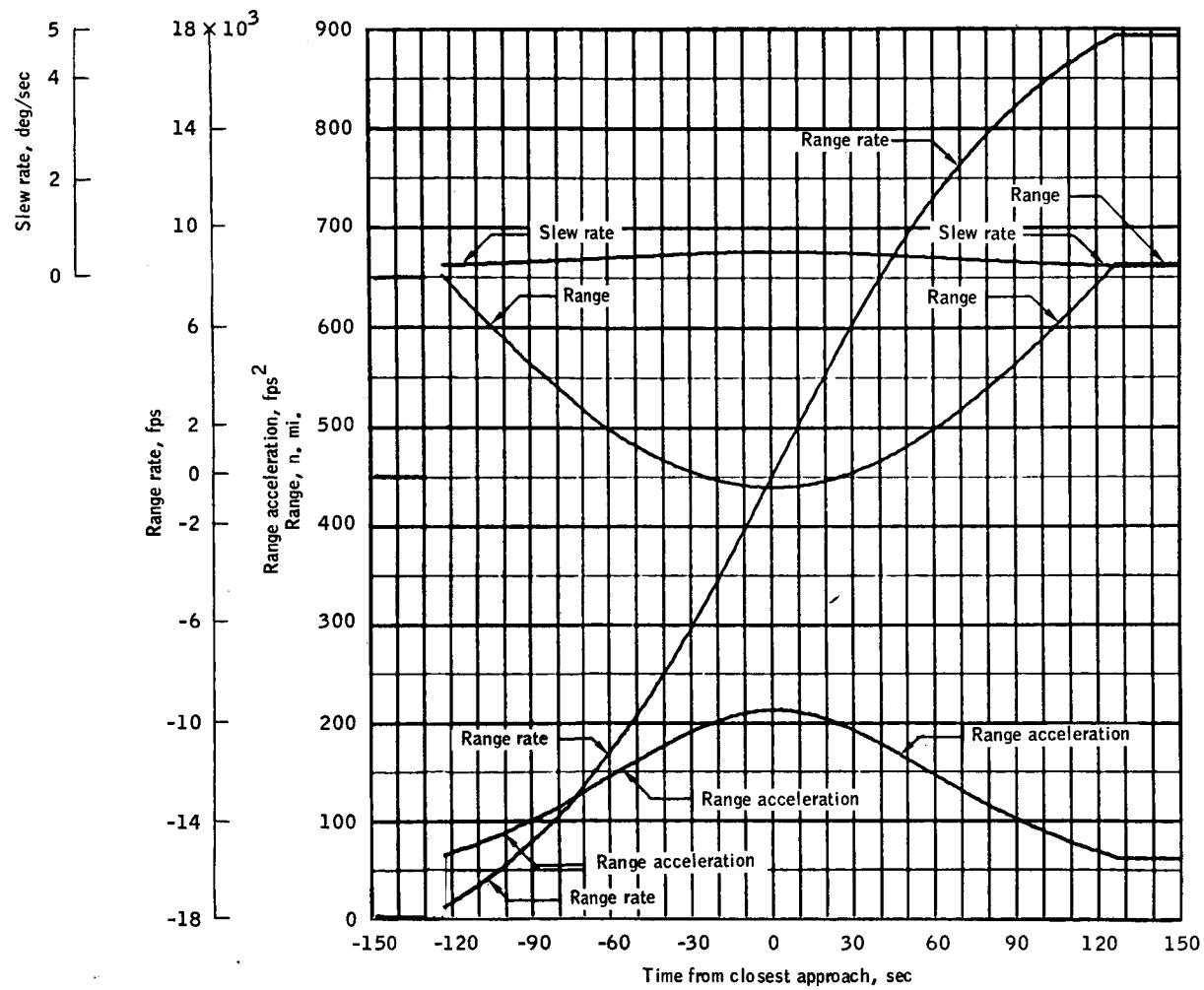
(f) Revolution 17.

Figure 3.- Continued.



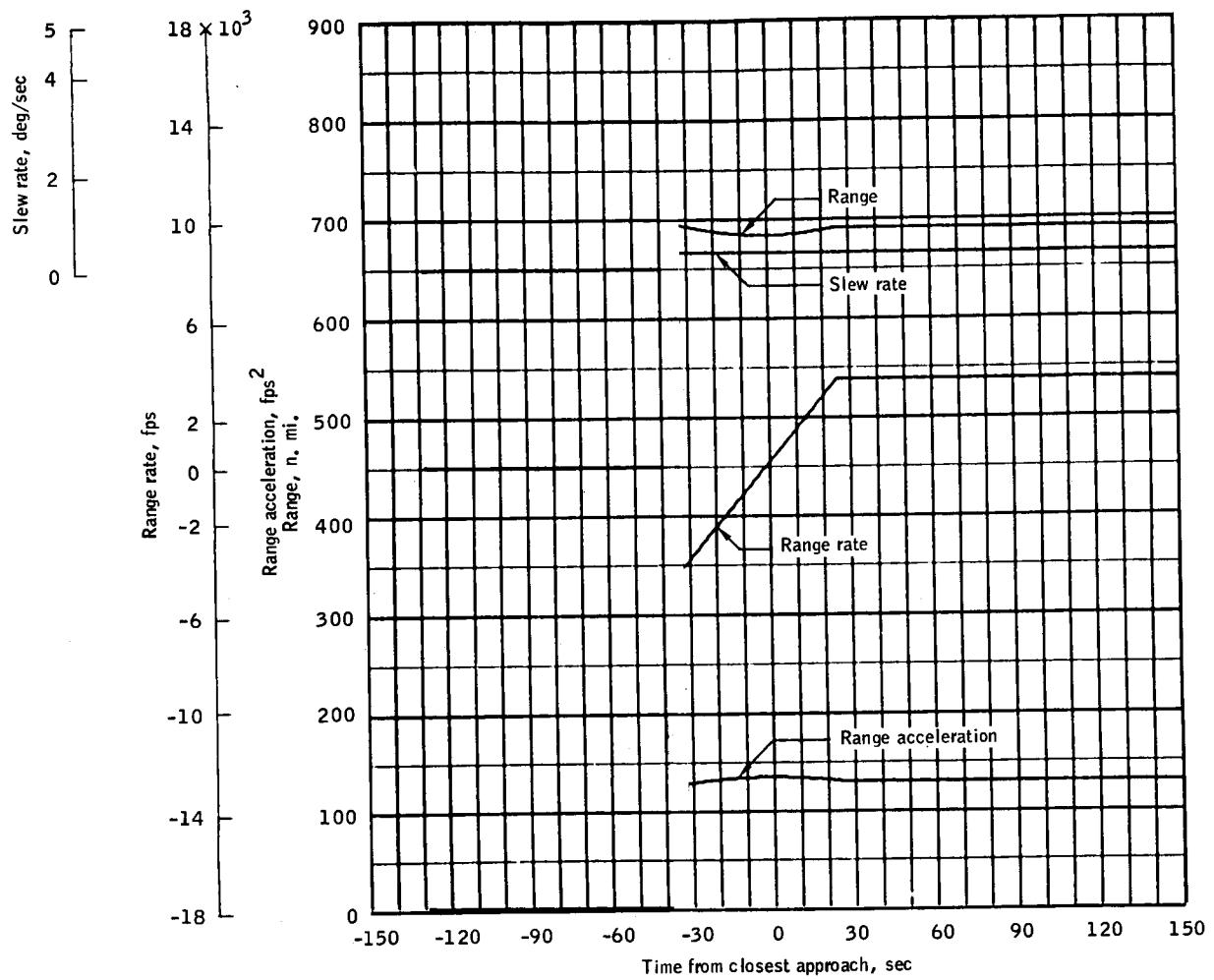
(g) Revolution 18.

Figure 3.- Continued.



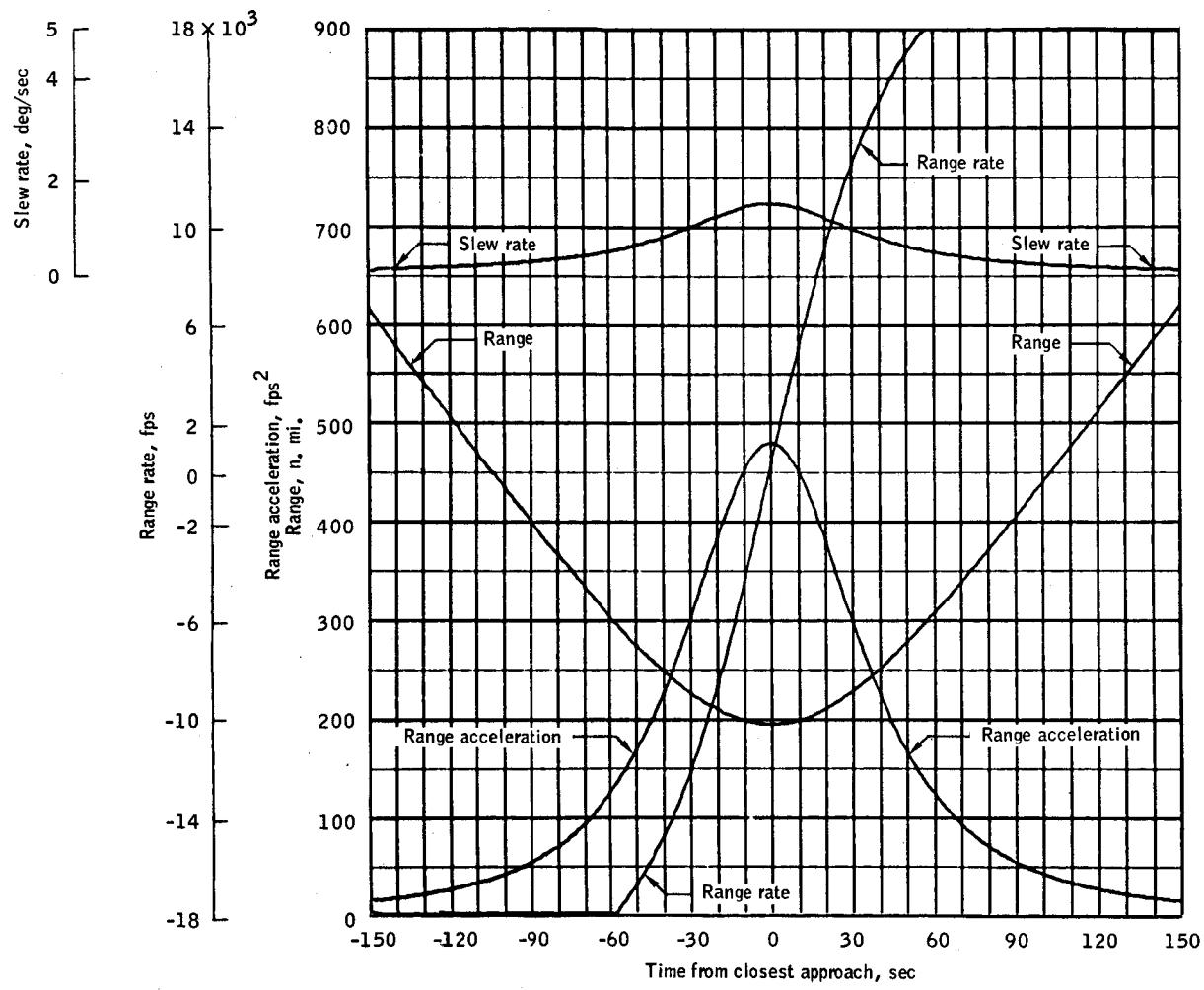
(h) Revolution 19.

Figure 3.- Continued.



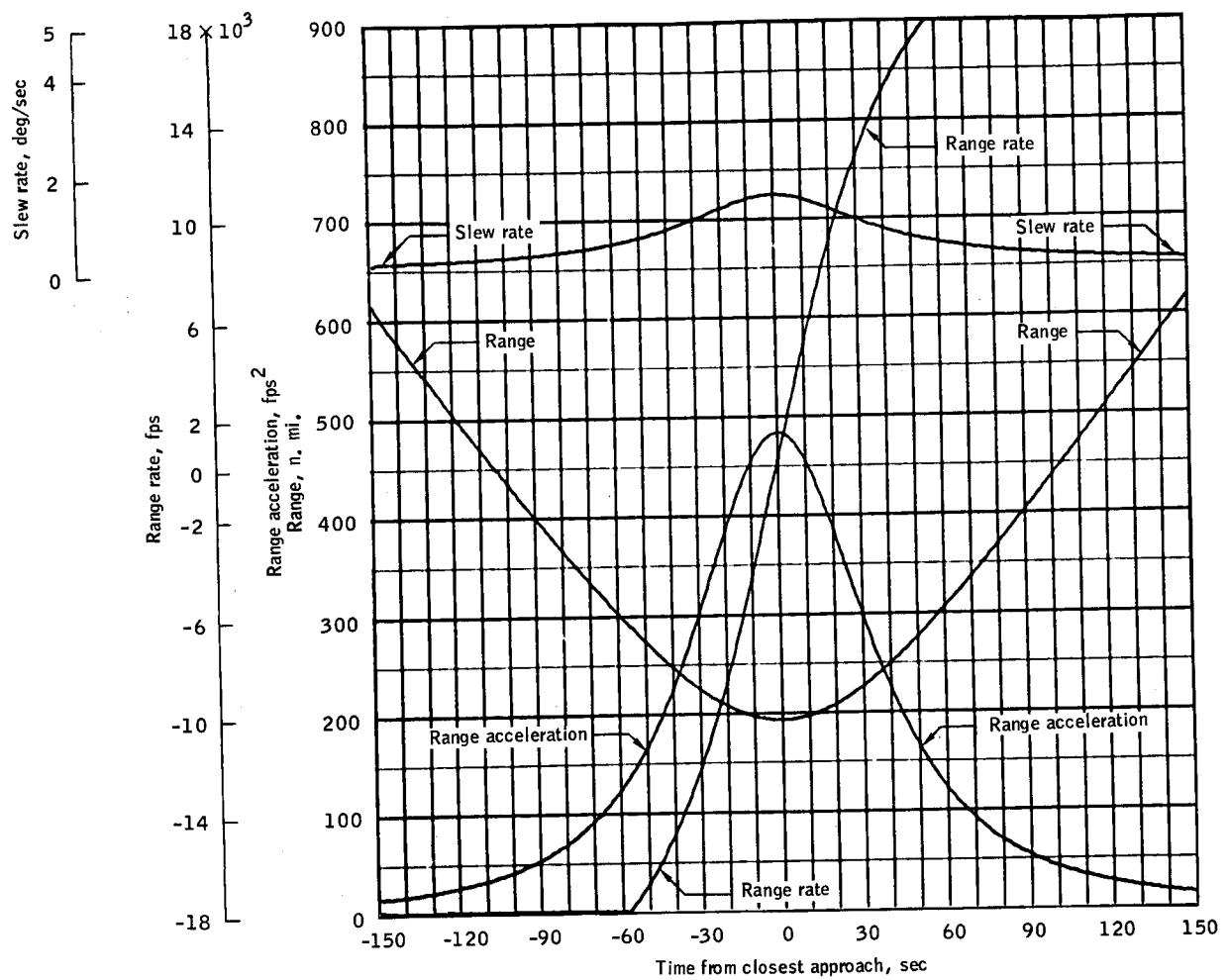
(i) Revolution 29.

Figure 3.- Continued.



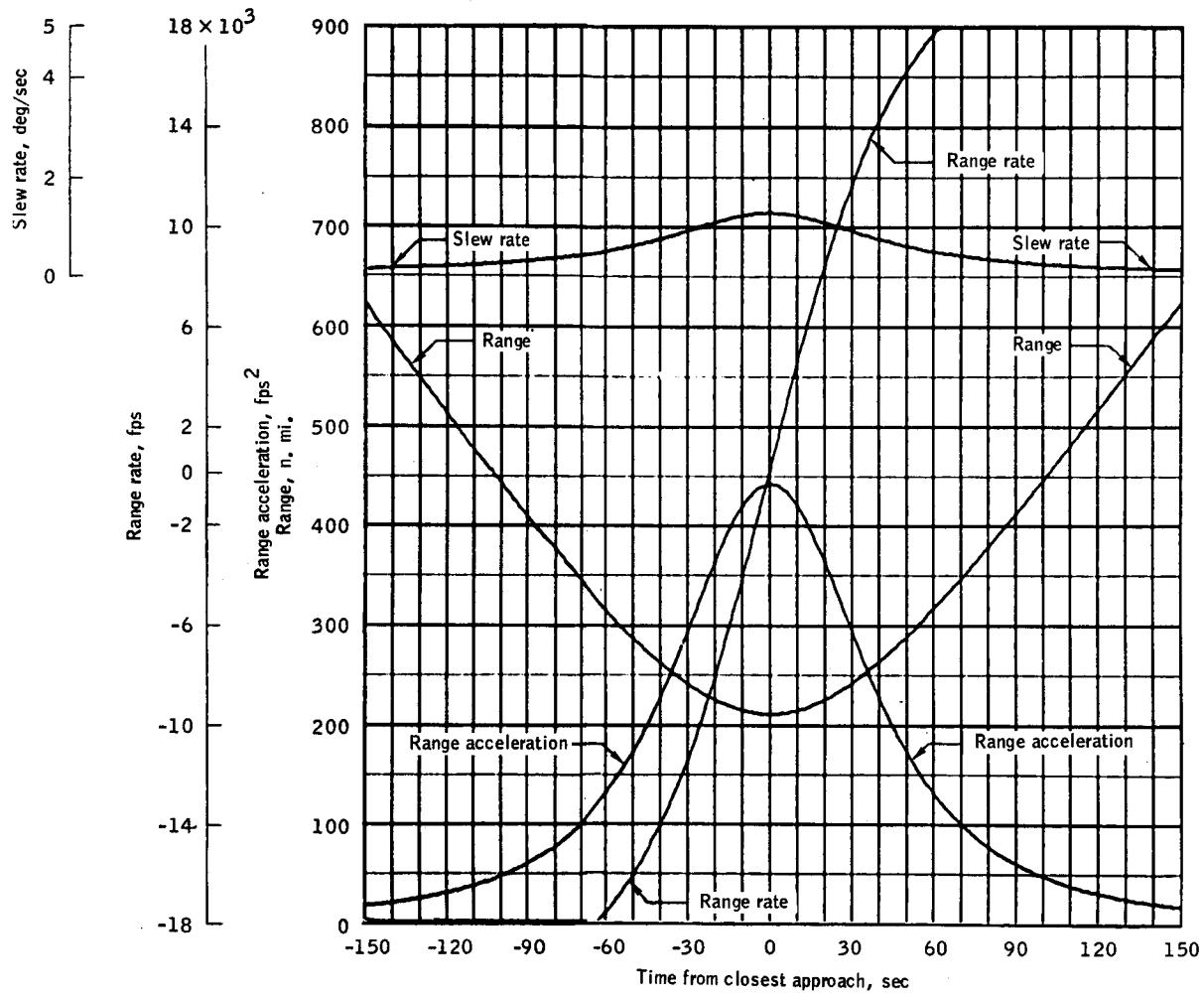
(j) Revolution 30.

Figure 3.- Continued.



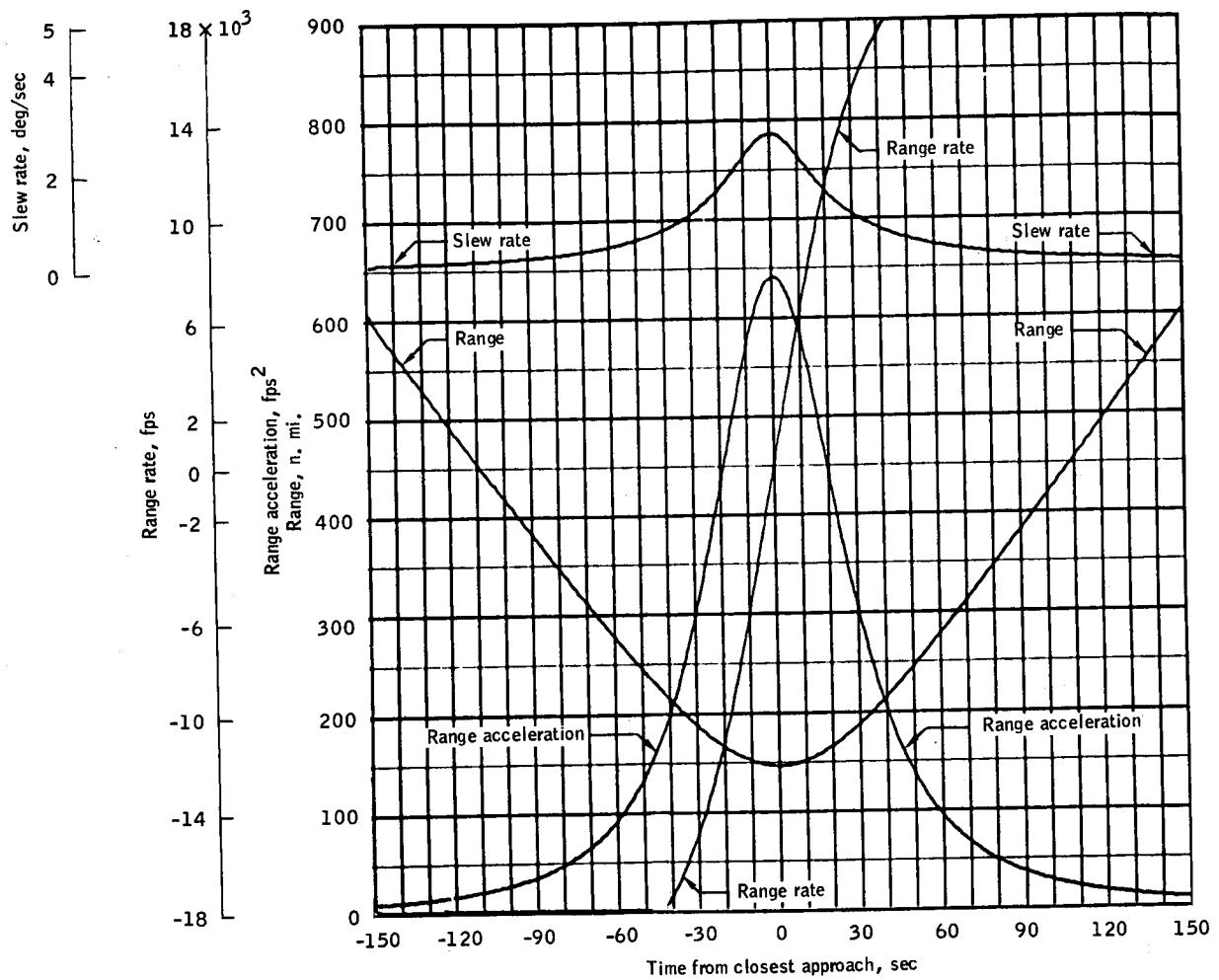
(k) Revolution 31.

Figure 3.- Continued.



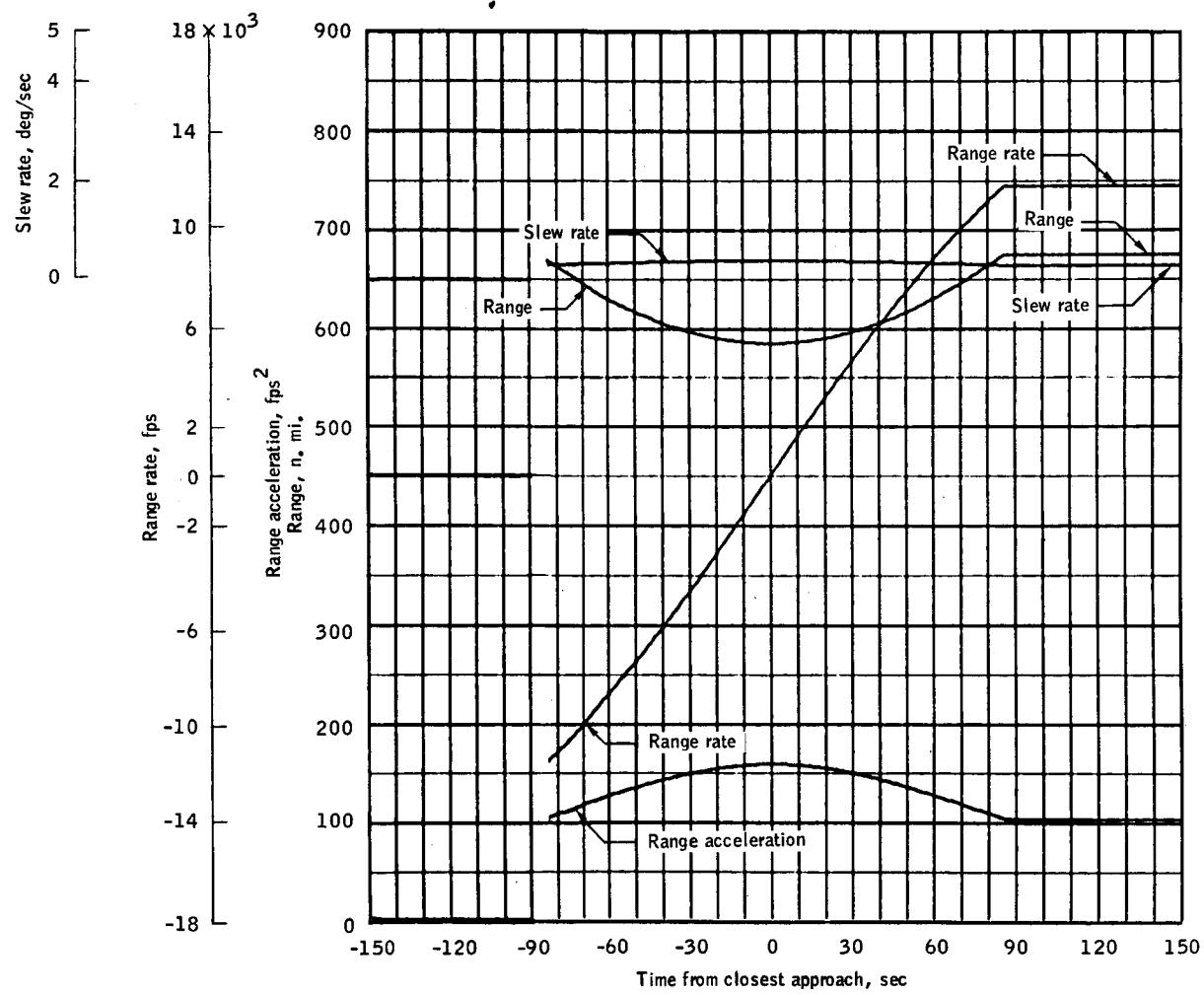
(I) Revolution 32.

Figure 3.- Continued.



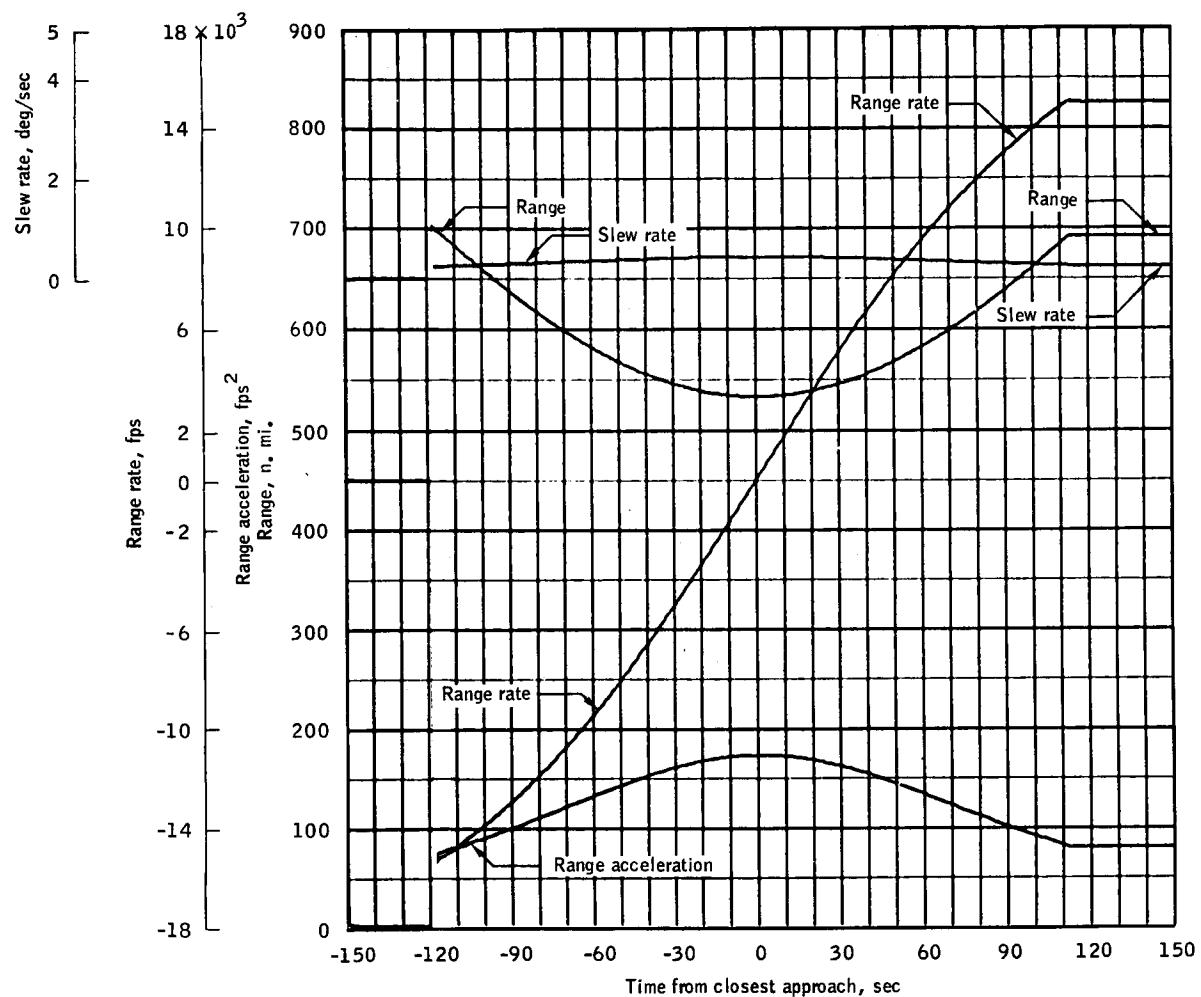
(m) Revolution 33.

Figure 3.- Continued.



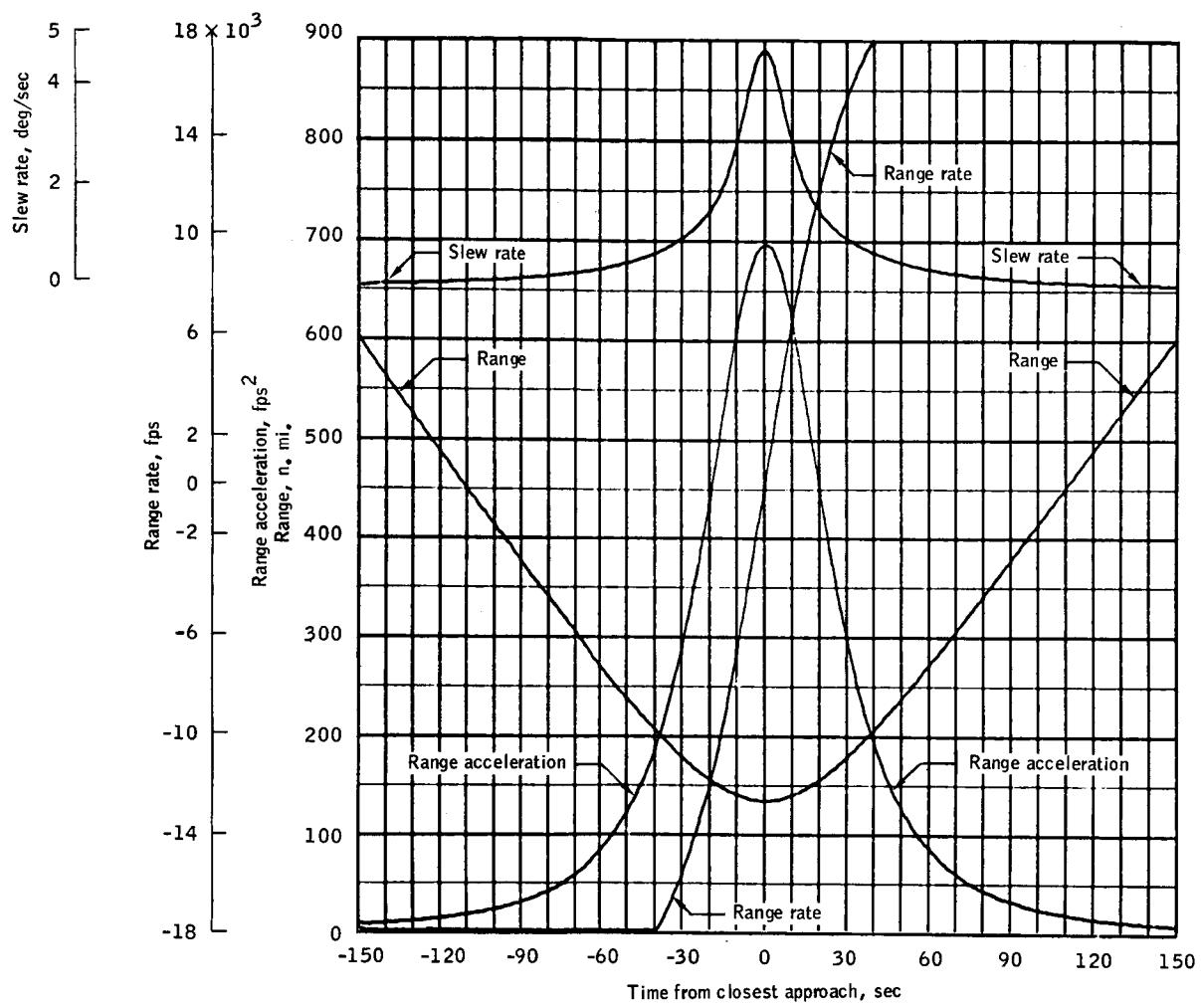
(n) Revolution 34.

Figure 3.- Continued.



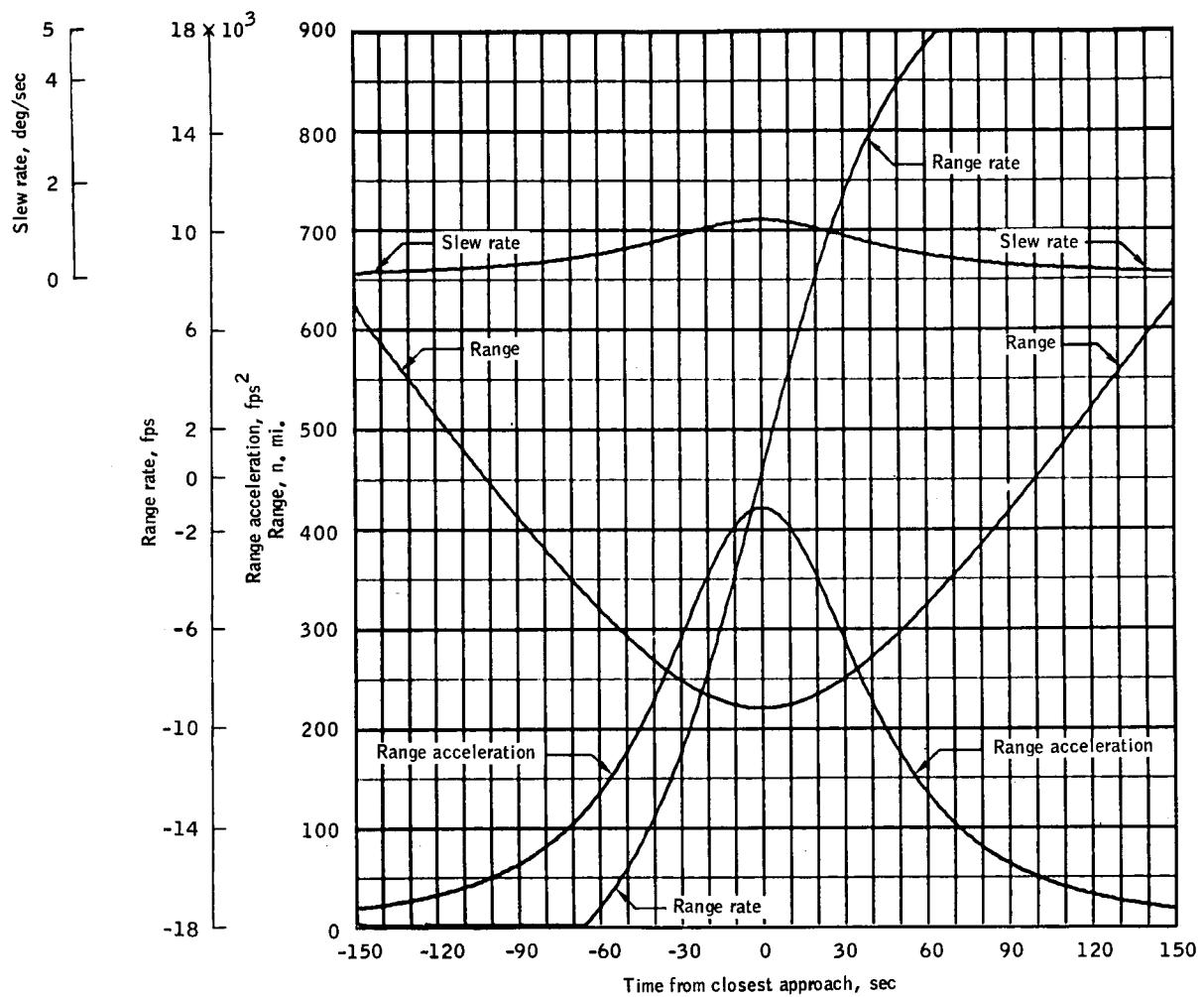
(o) Revolution 44.

Figure 3.- Continued.



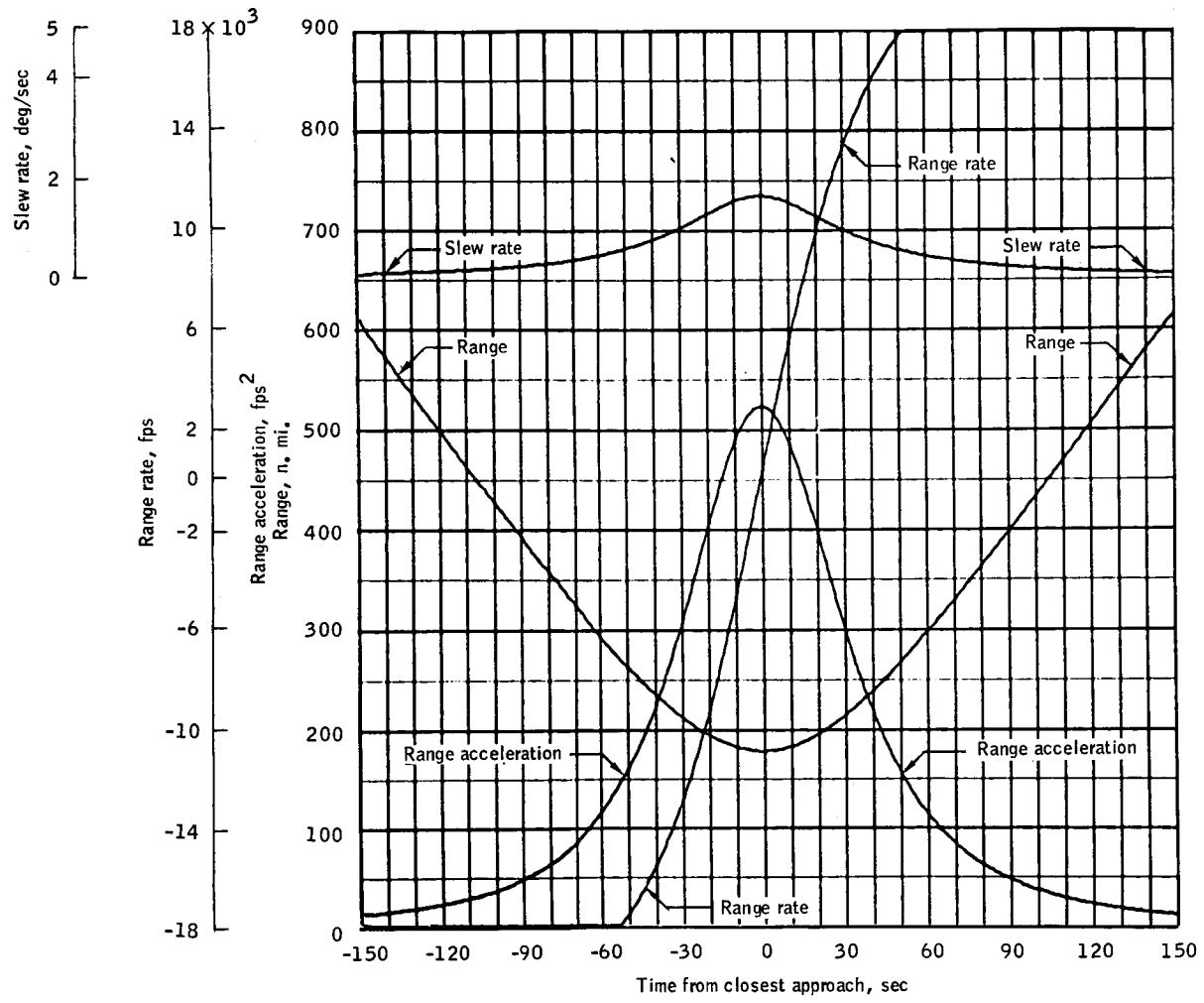
(p) Revolution 45.

Figure 3.- Continued.



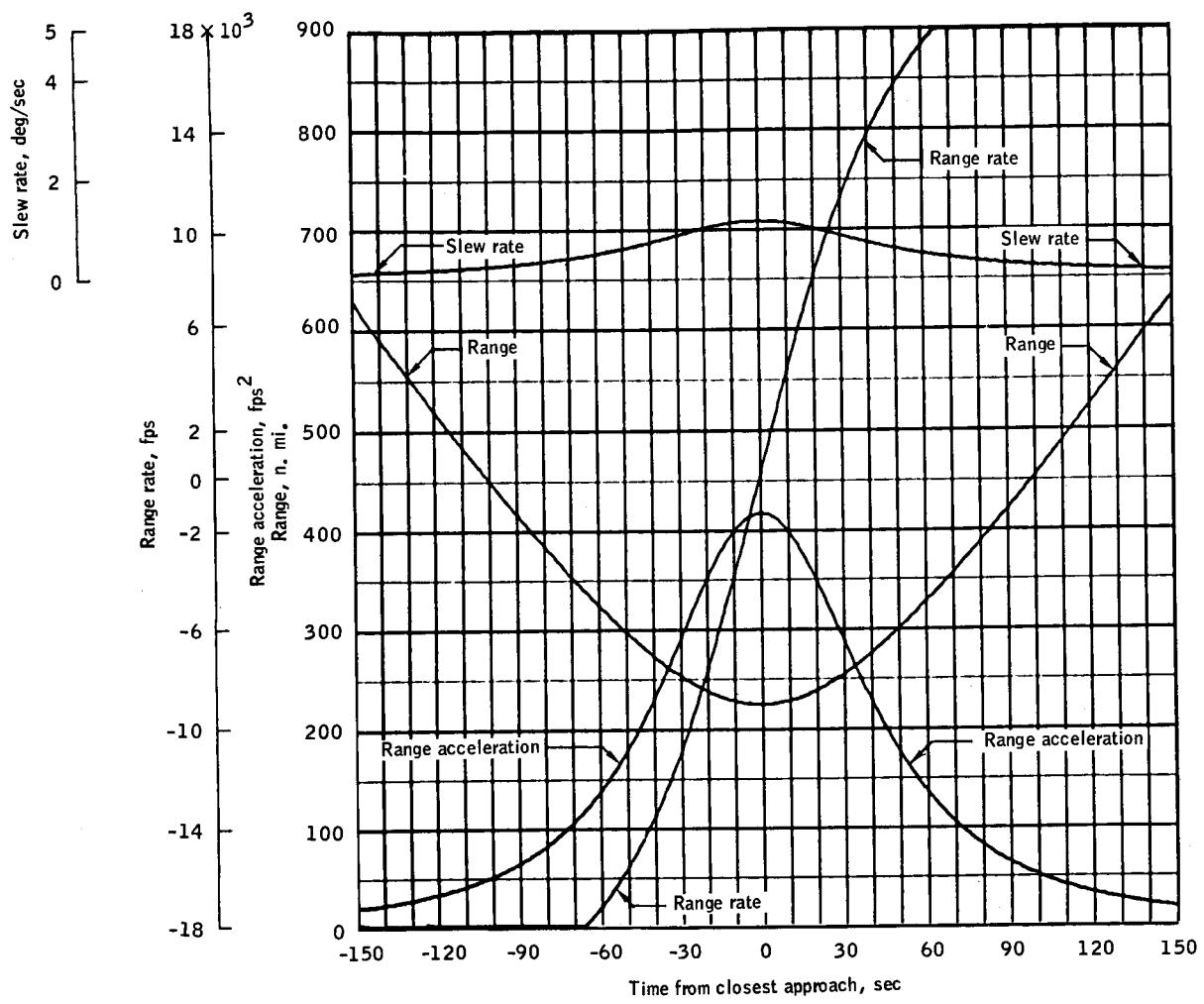
(q) Revolution 46.

Figure 3.- Continued.



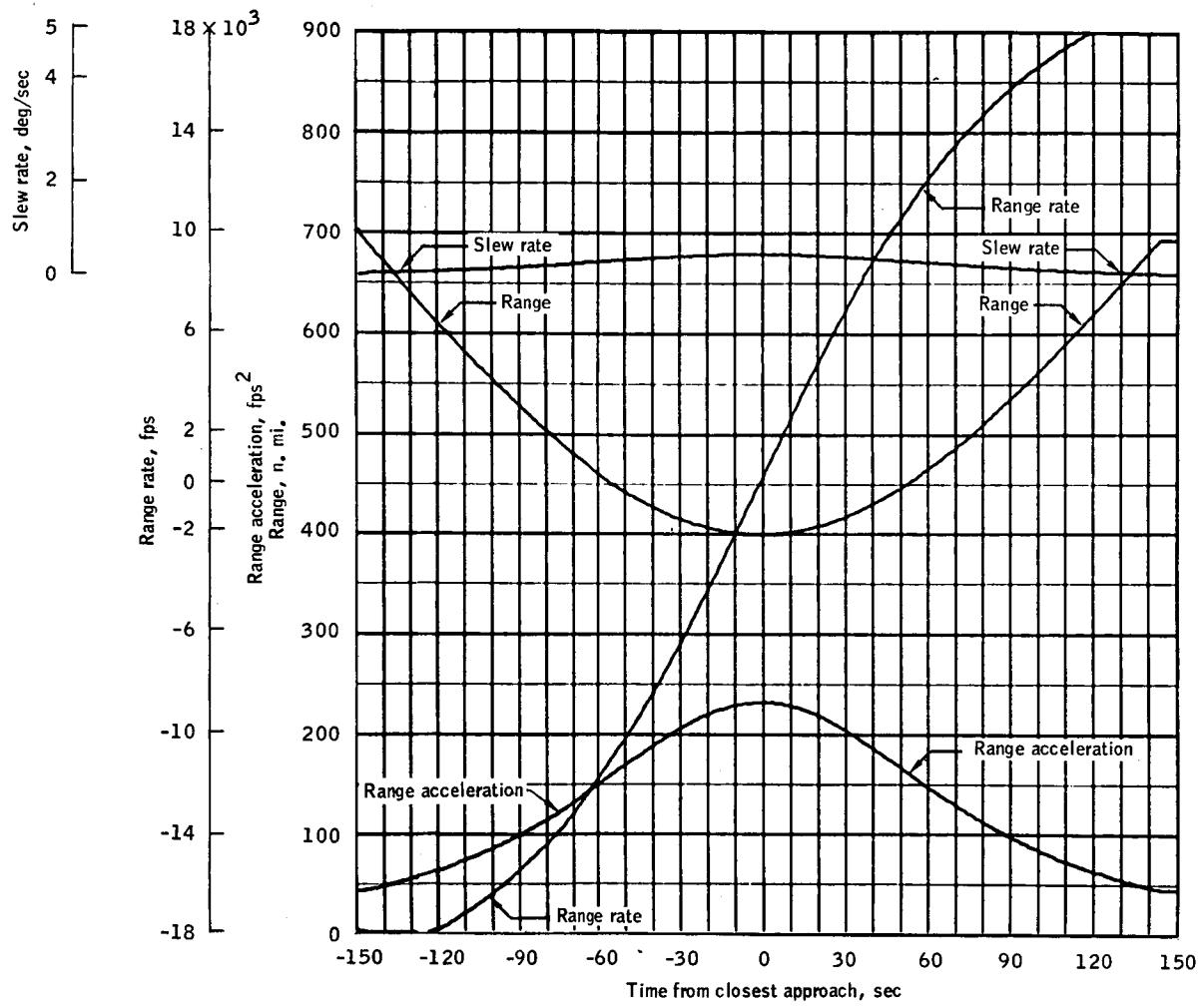
(r) Revolution 47.

Figure 3.- Continued.



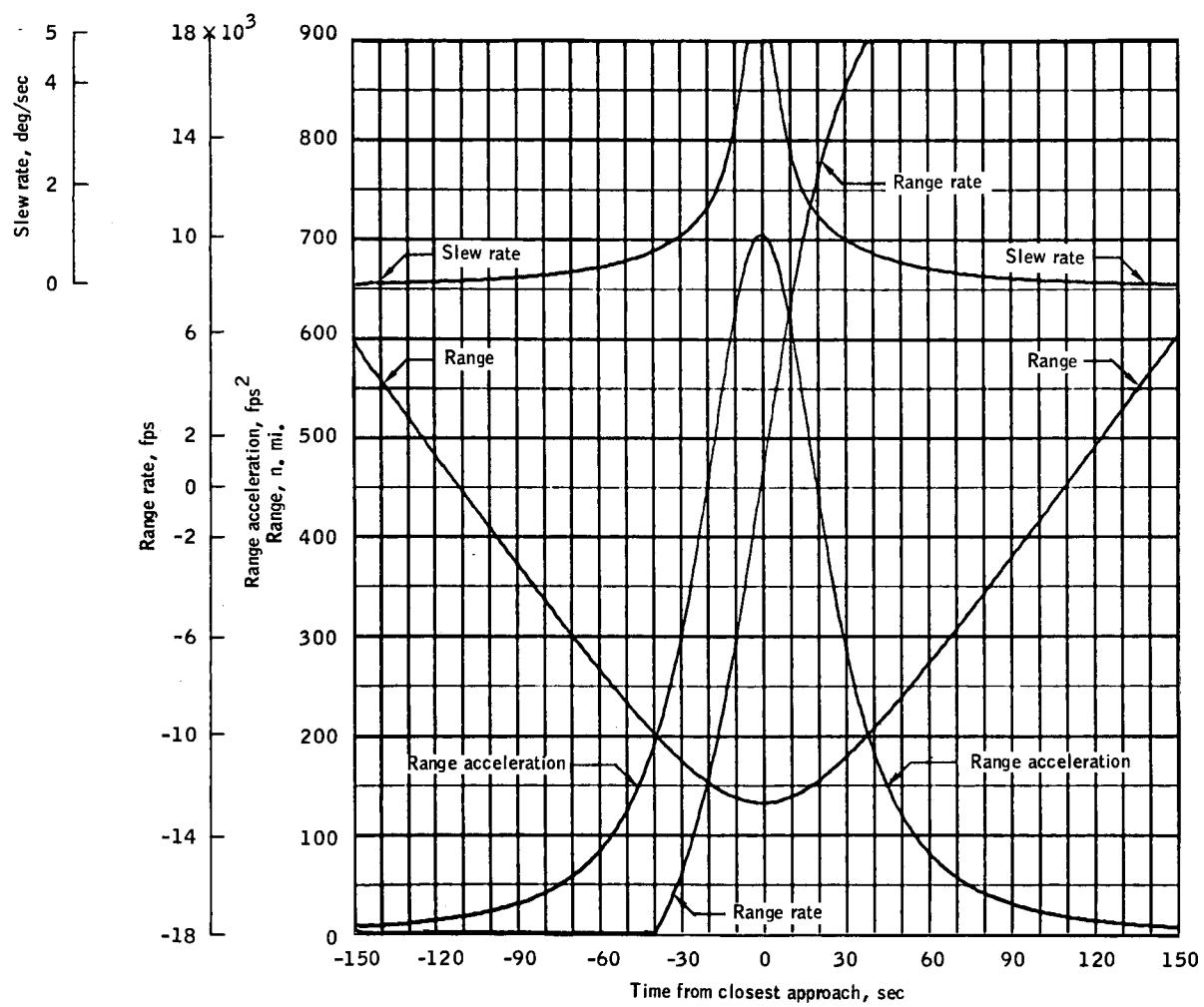
(s) Revolution 48.

Figure 3.- Continued.



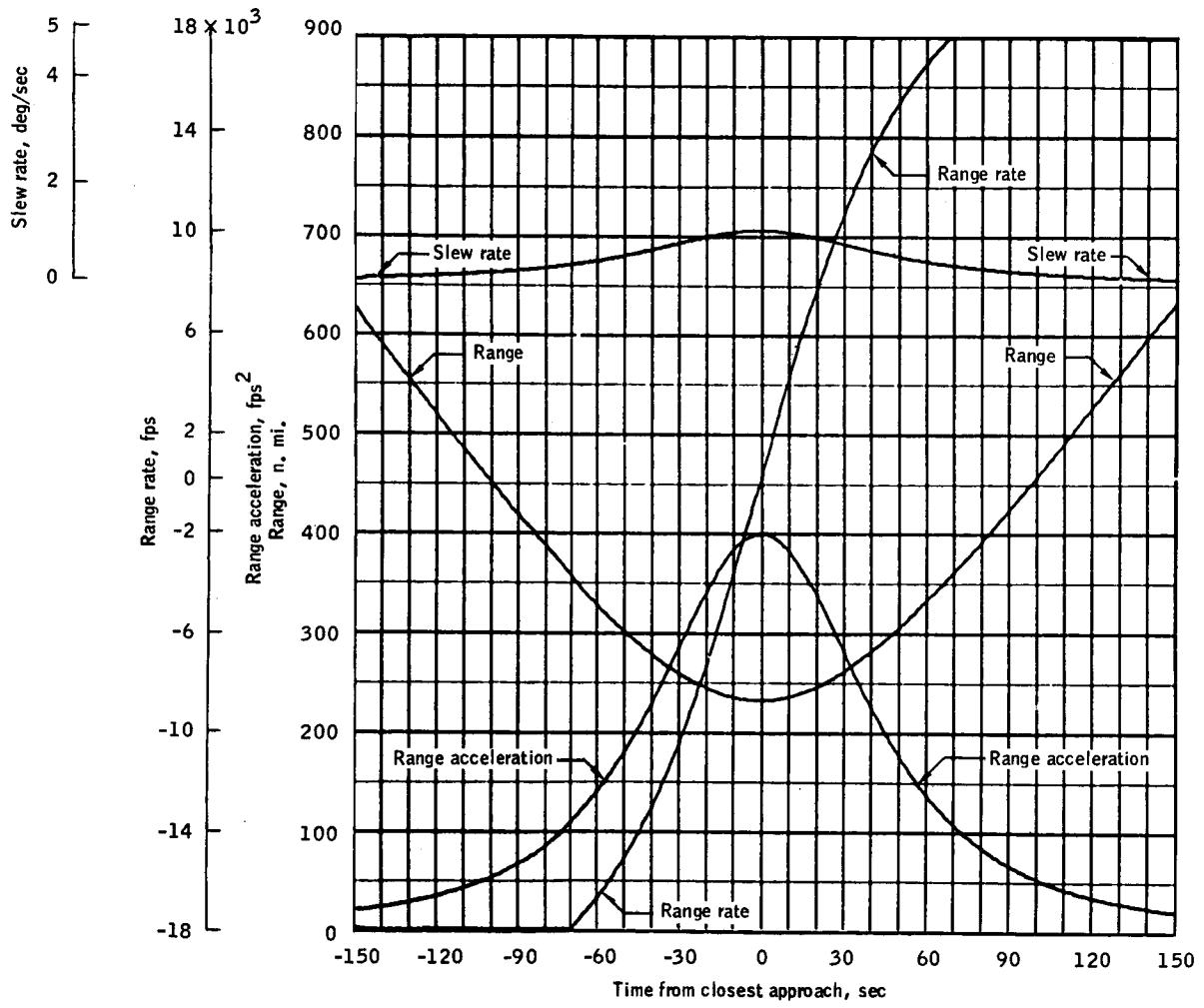
(t) Revolution 59.

Figure 3.- Continued.



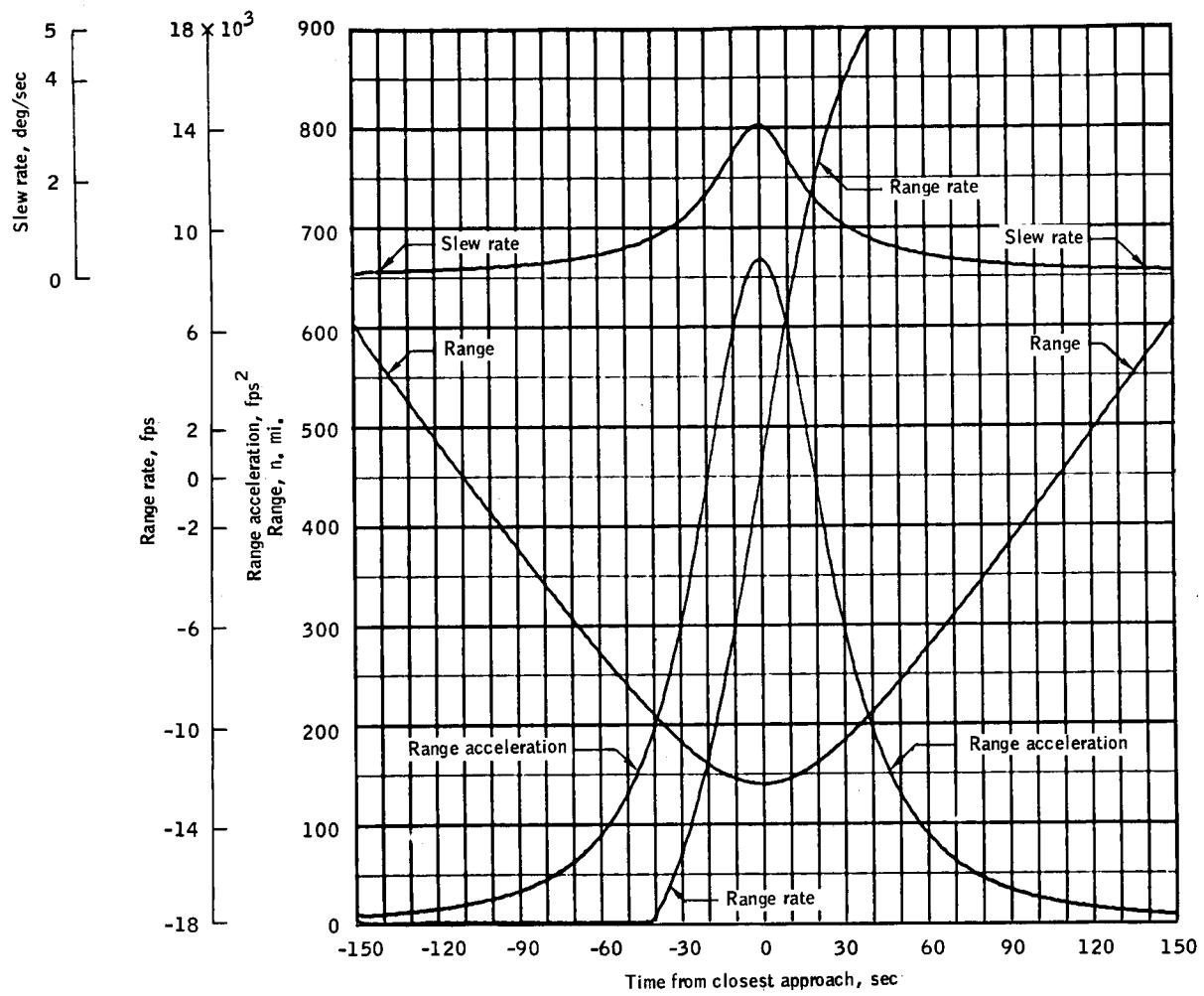
(u) Revolution 60.

Figure 3.- Continued.



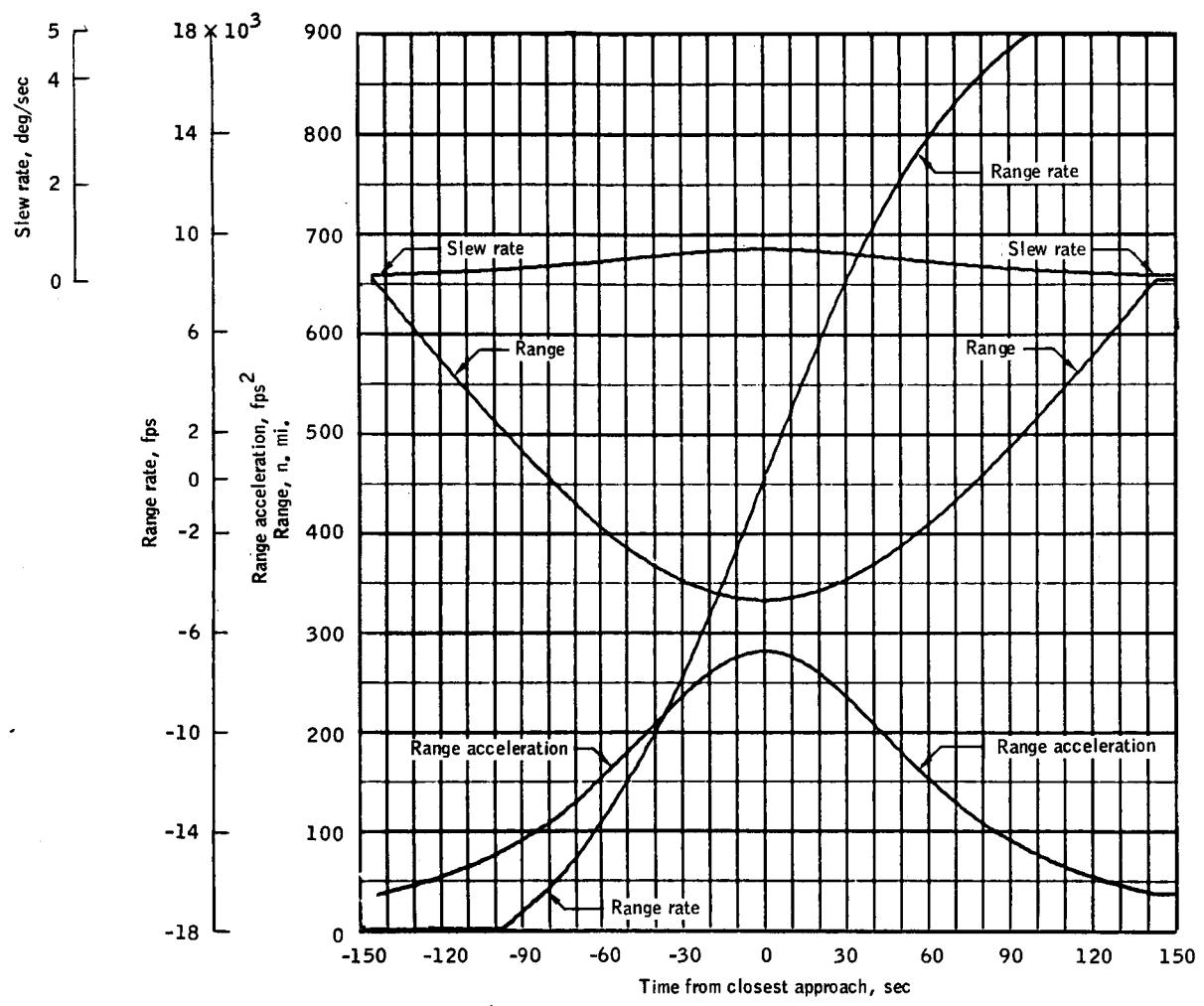
(v) Revolution 61.

Figure 3.- Continued.



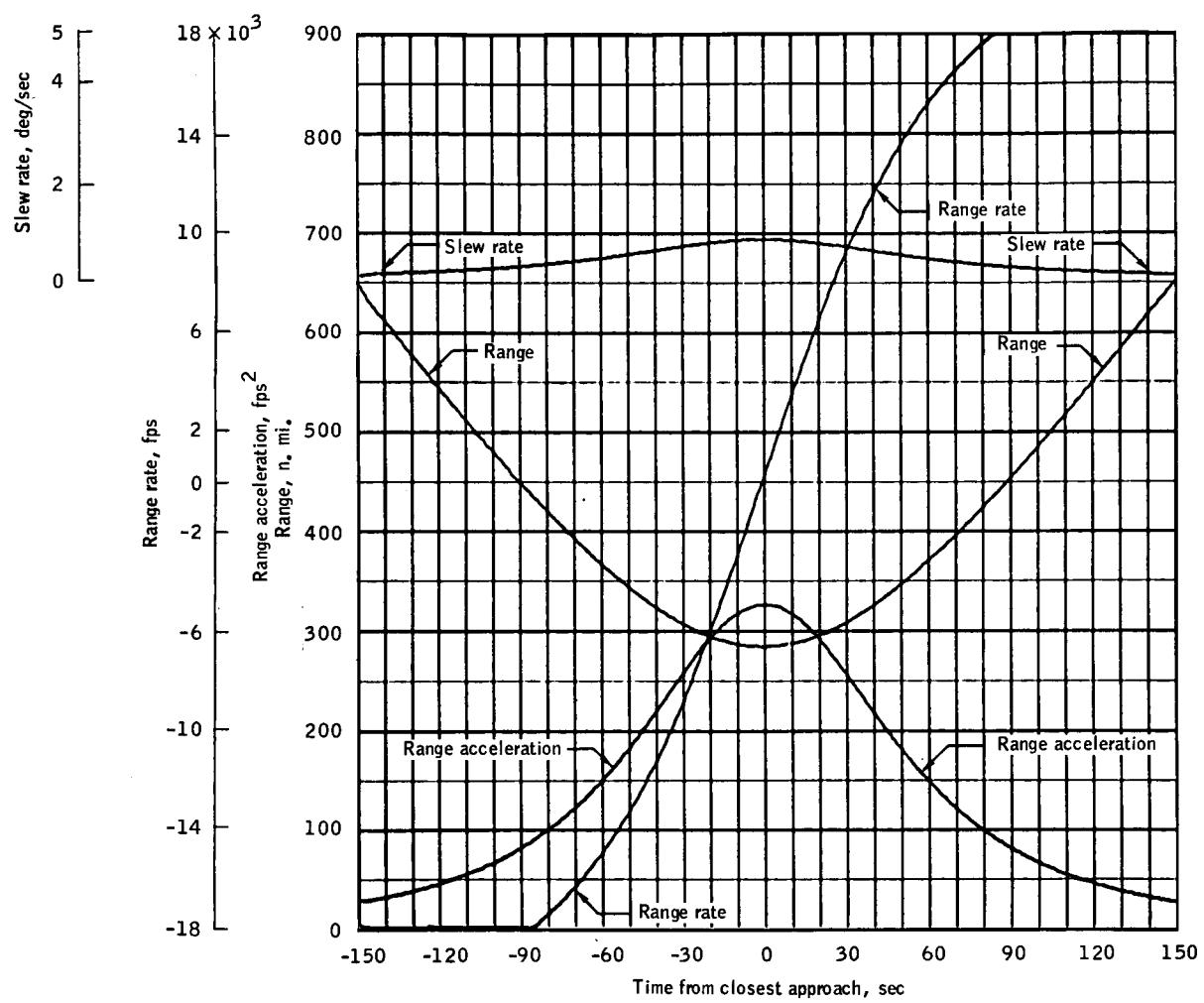
(w) Revolution 62.

Figure 3.- Continued.



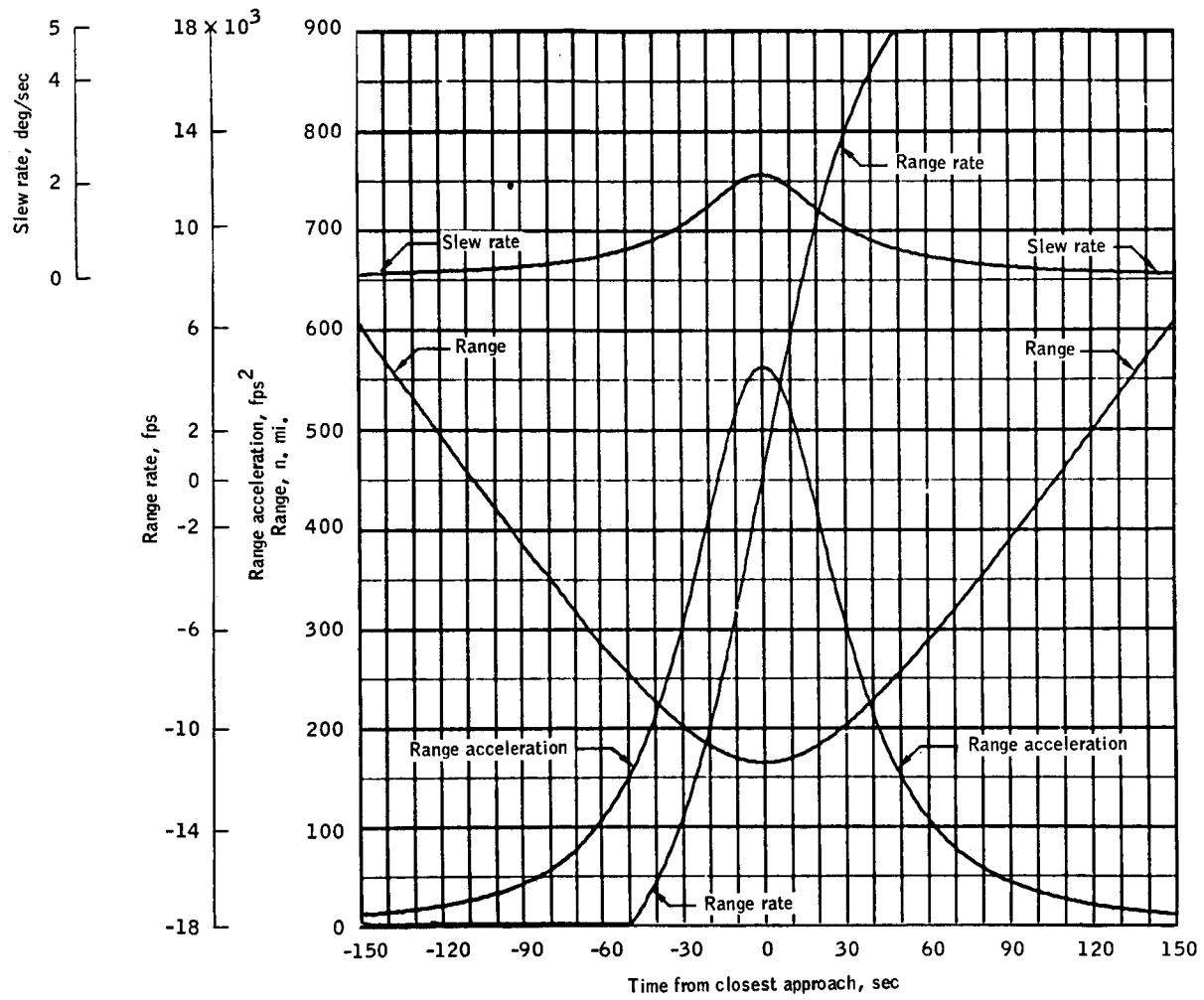
(x) Revolution 63.

Figure 3.- Continued.



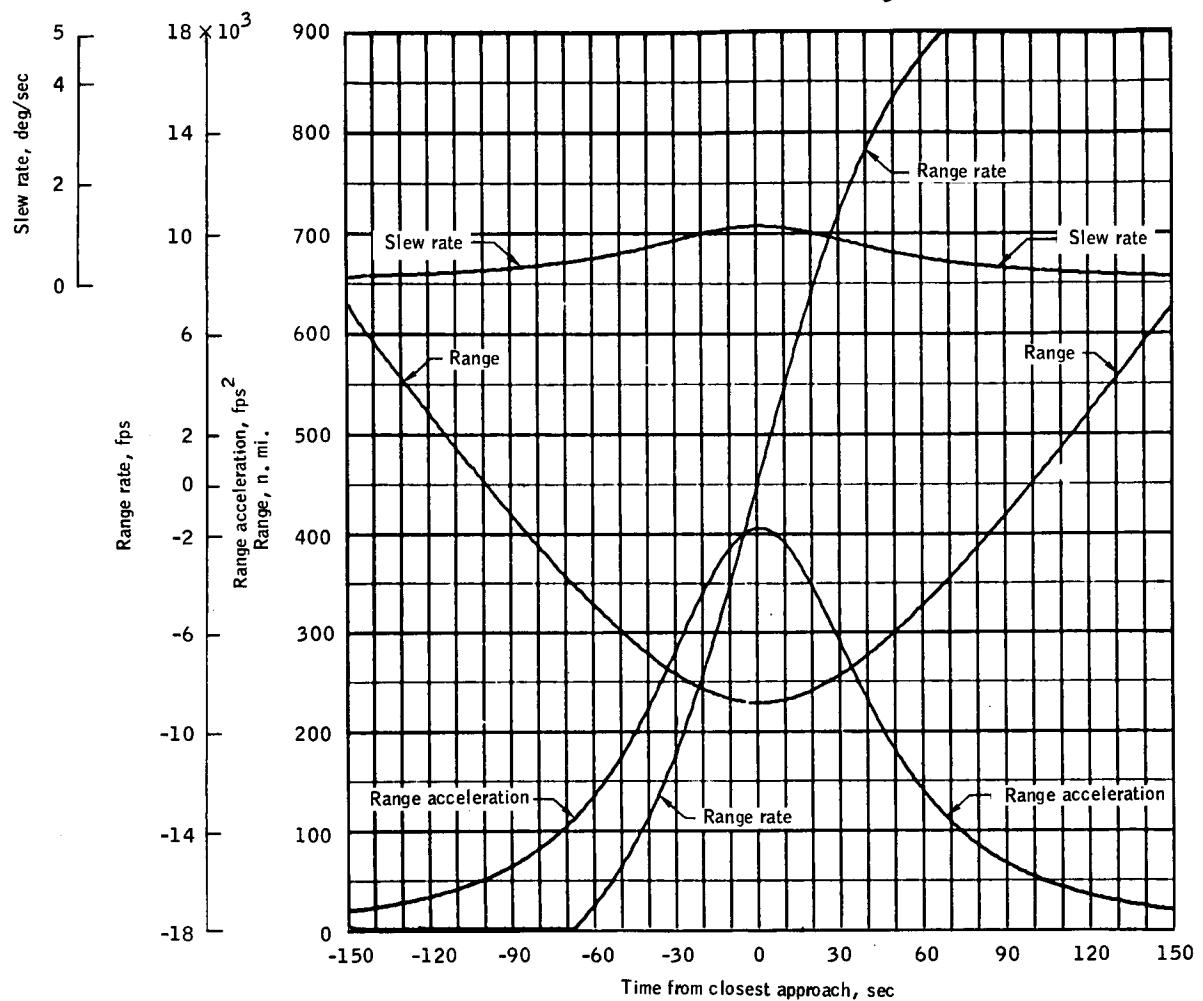
(y) Revolution 74.

Figure 3.- Continued.



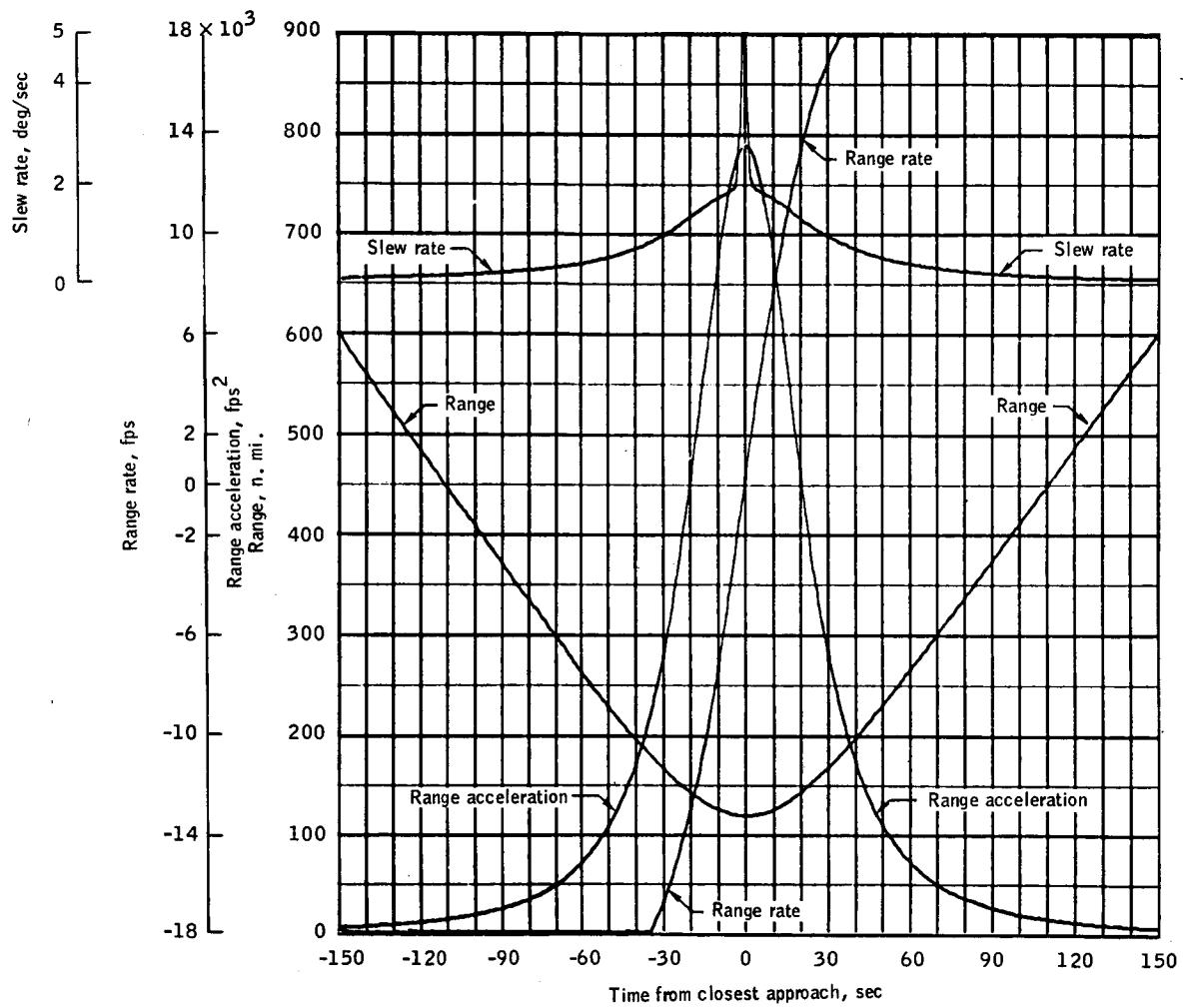
(z) Revolution 75.

Figure 3.- Continued.



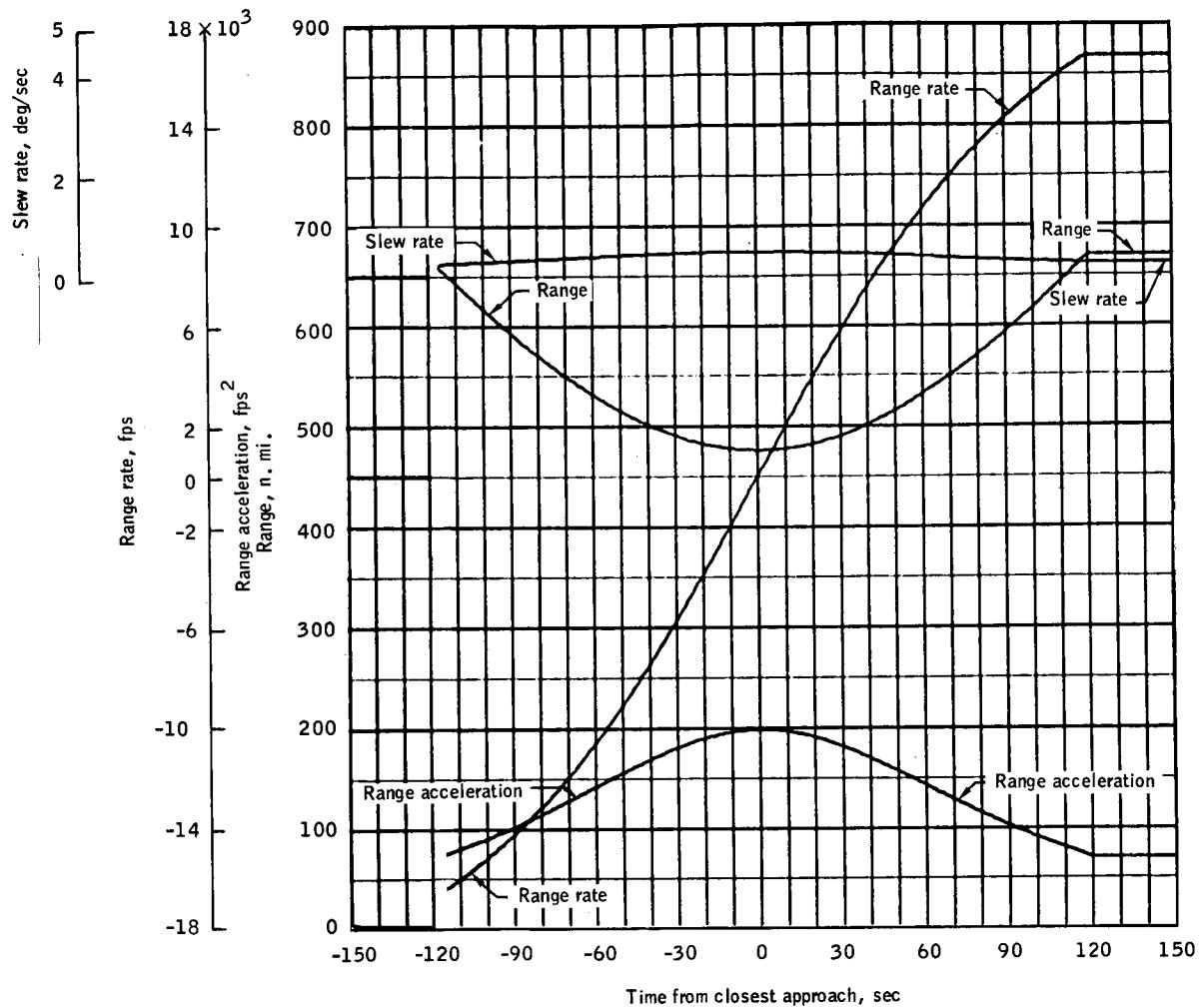
(aa) Revolution 76.

Figure 3.- Continued.



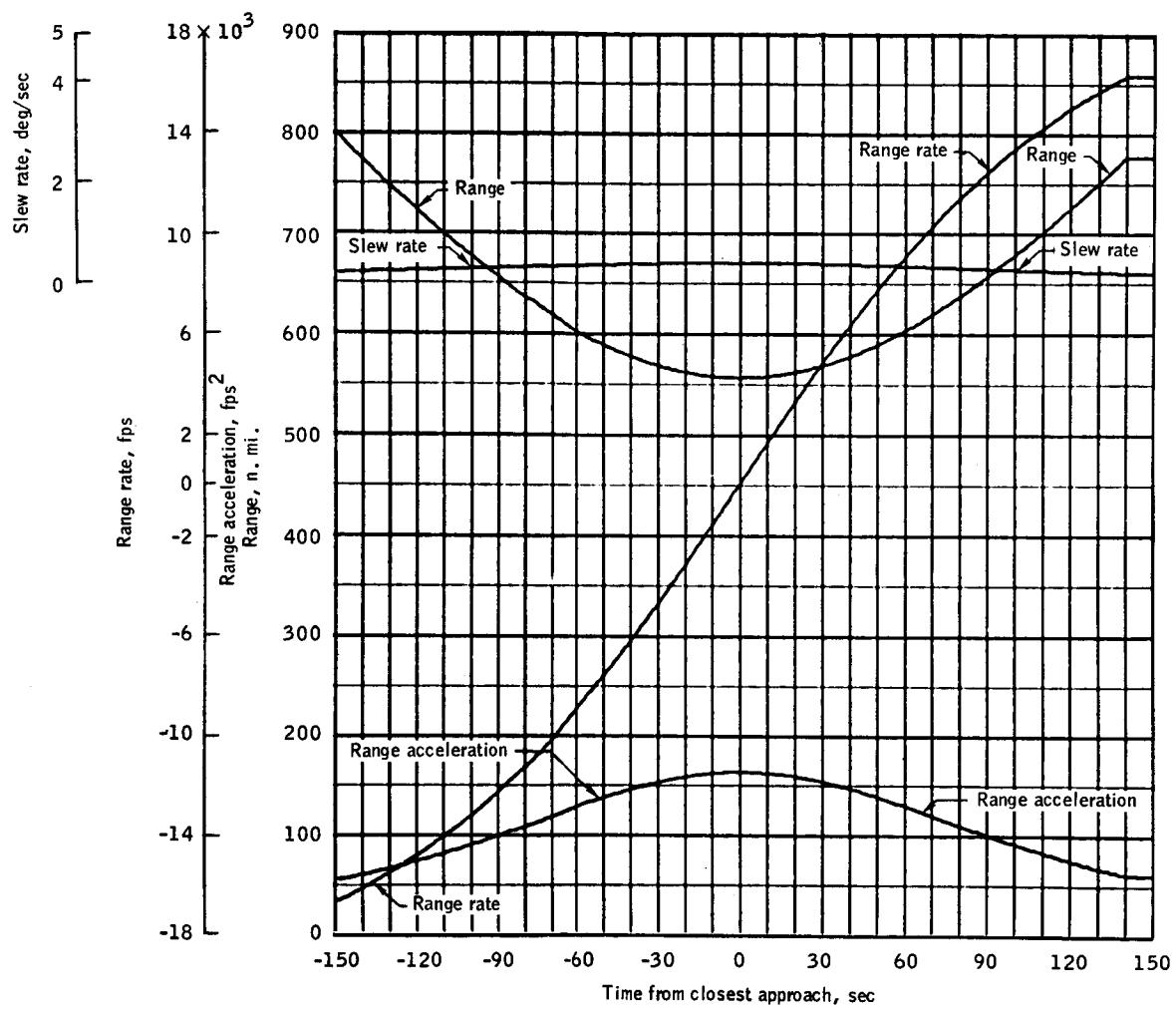
(bb) Revolution 77.

Figure 3.- Continued.



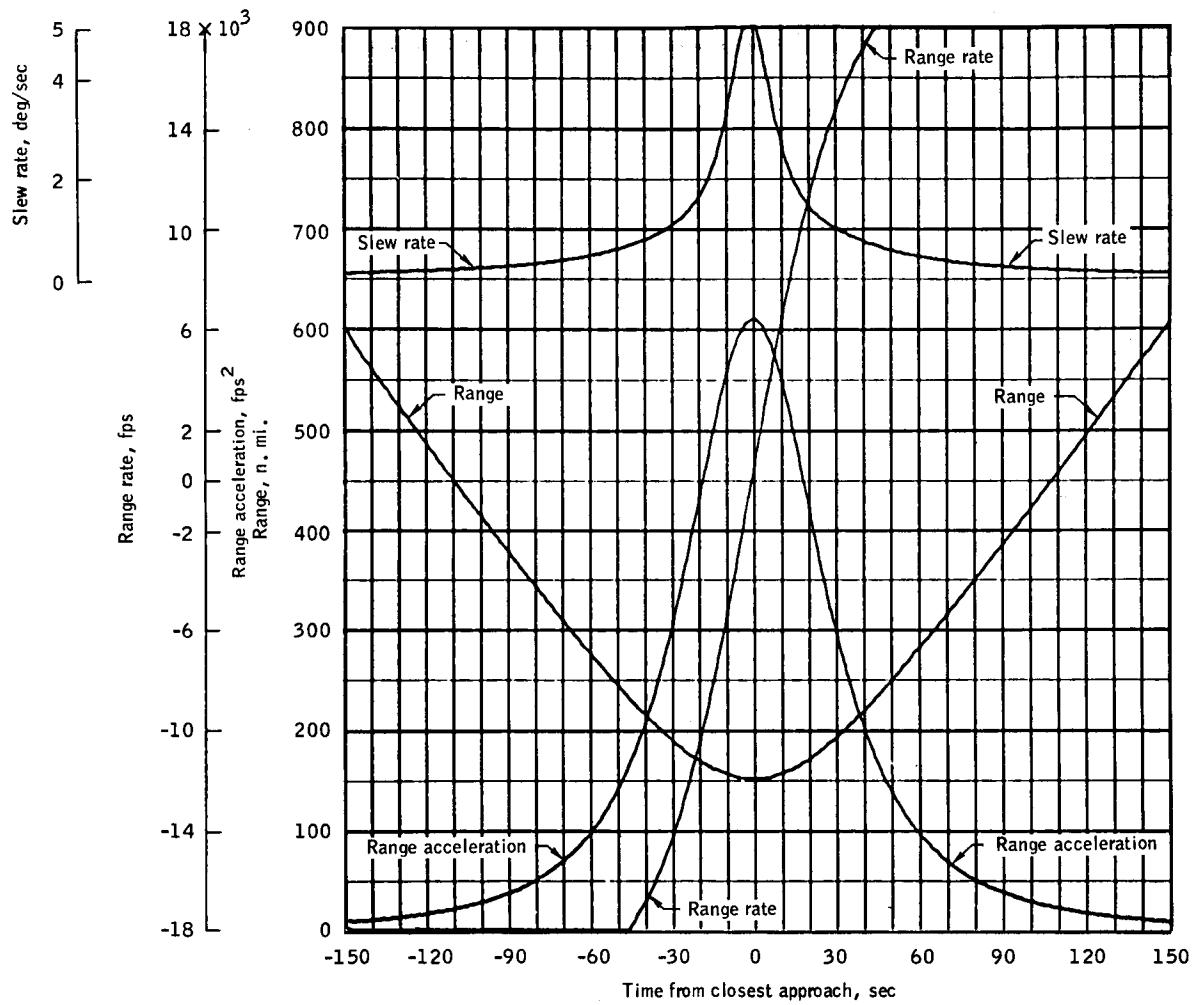
(cc) Revolution 78.

Figure 3.- Continued.



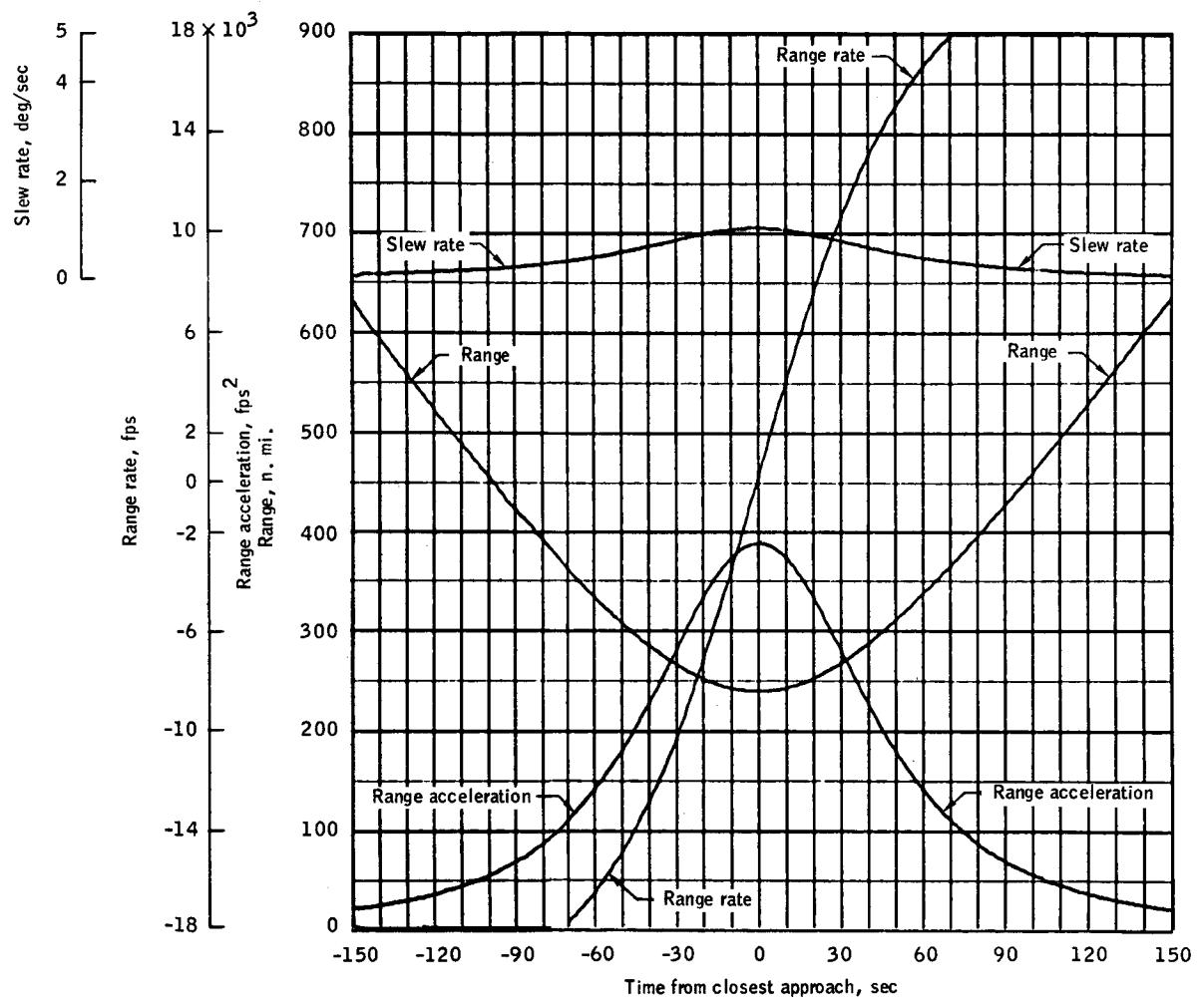
(dd) Revolution 88.

Figure 3.- Continued.



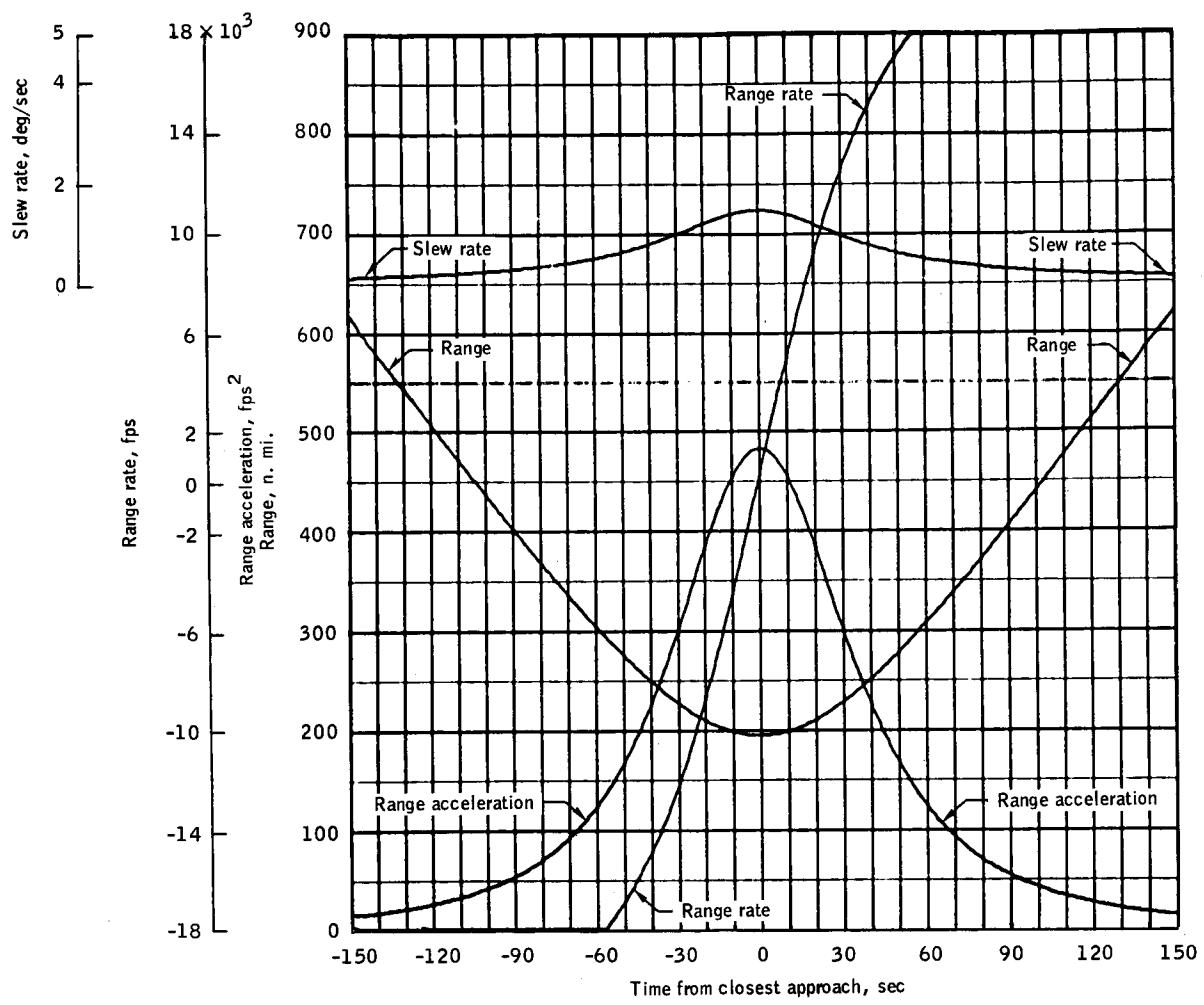
(ee) Revolution 89.

Figure 3.- Continued.



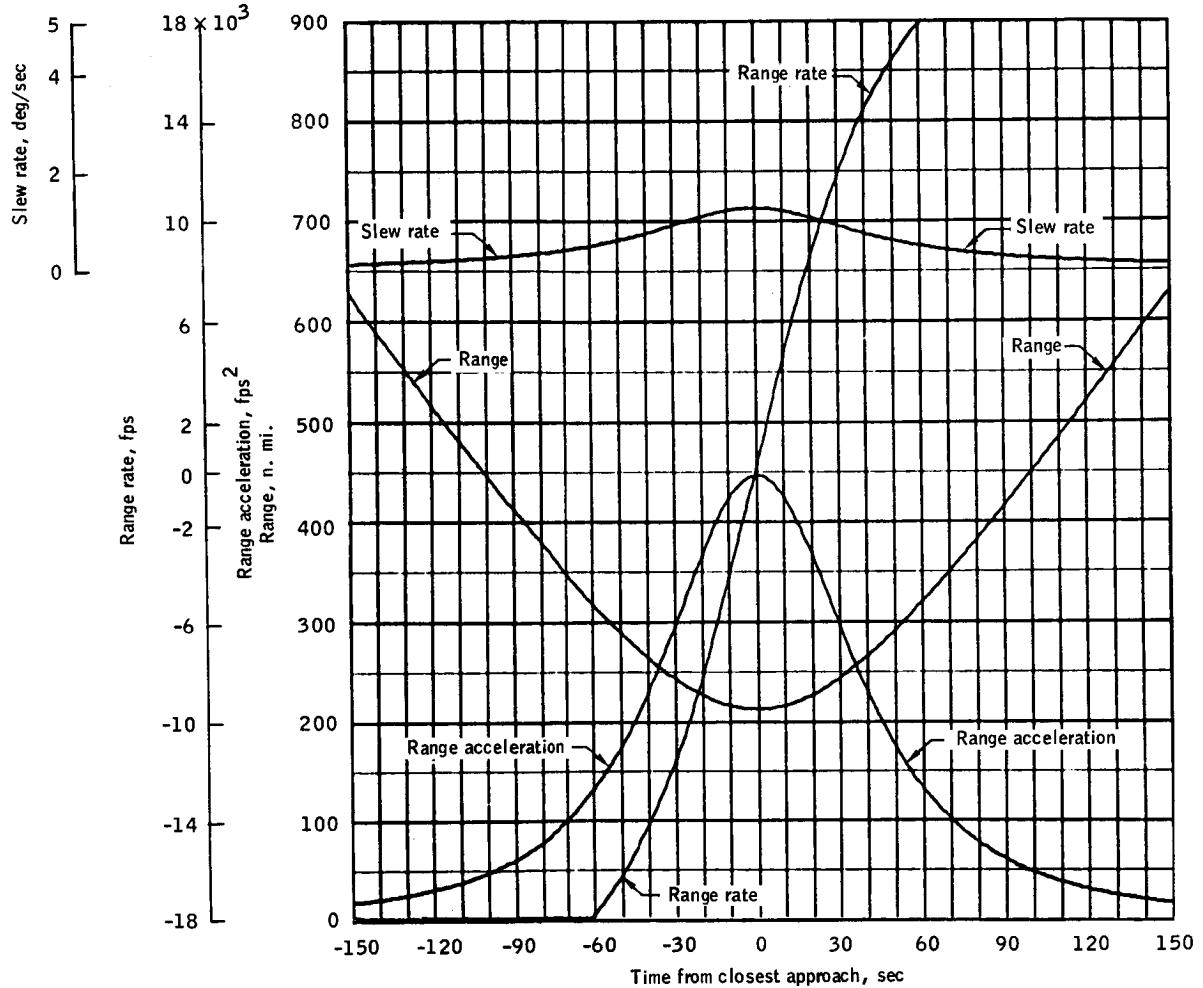
(ff) Revolution 90.

Figure 3.- Continued.



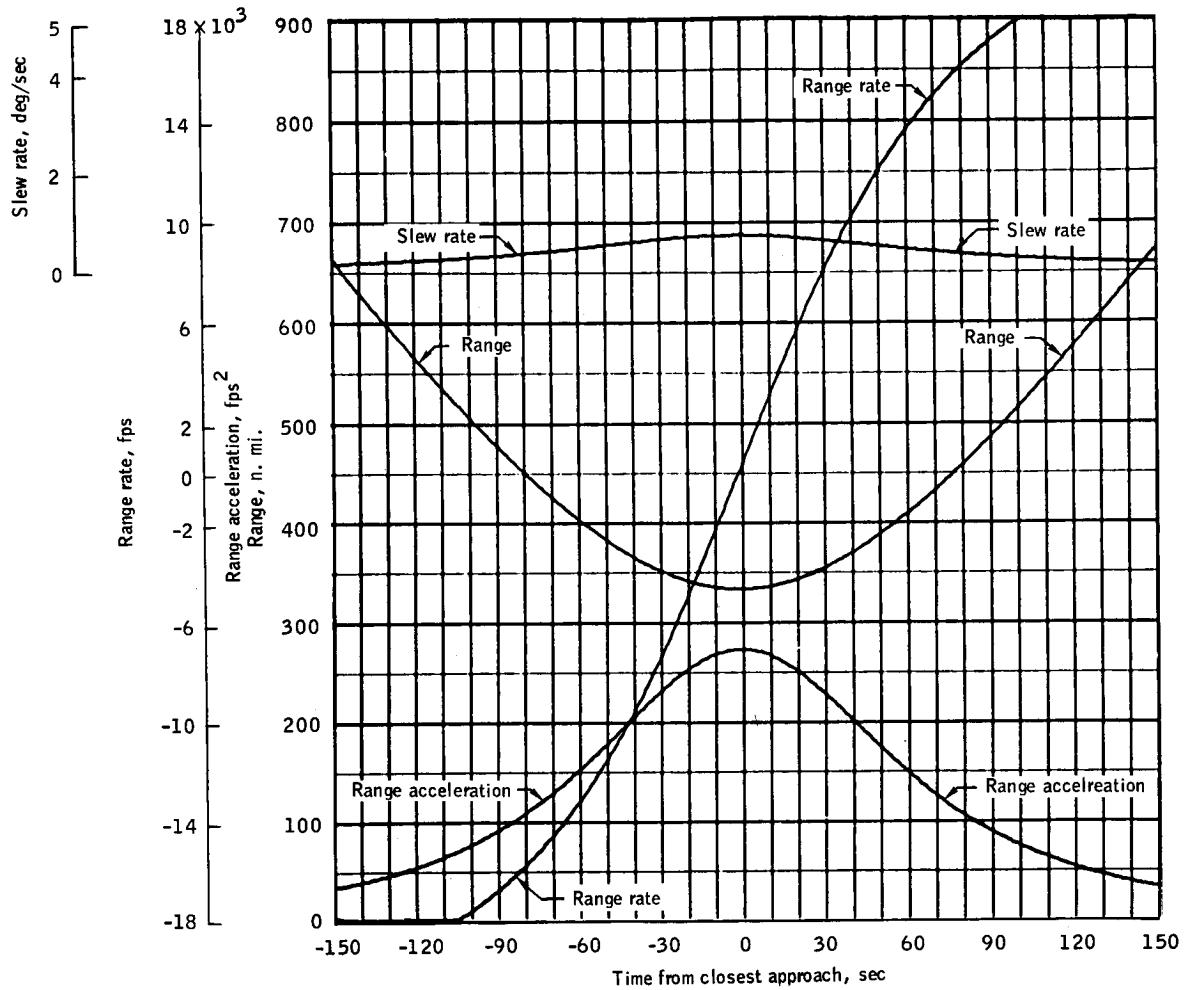
(gg) Revolution 91.

Figure 3.- Continued.



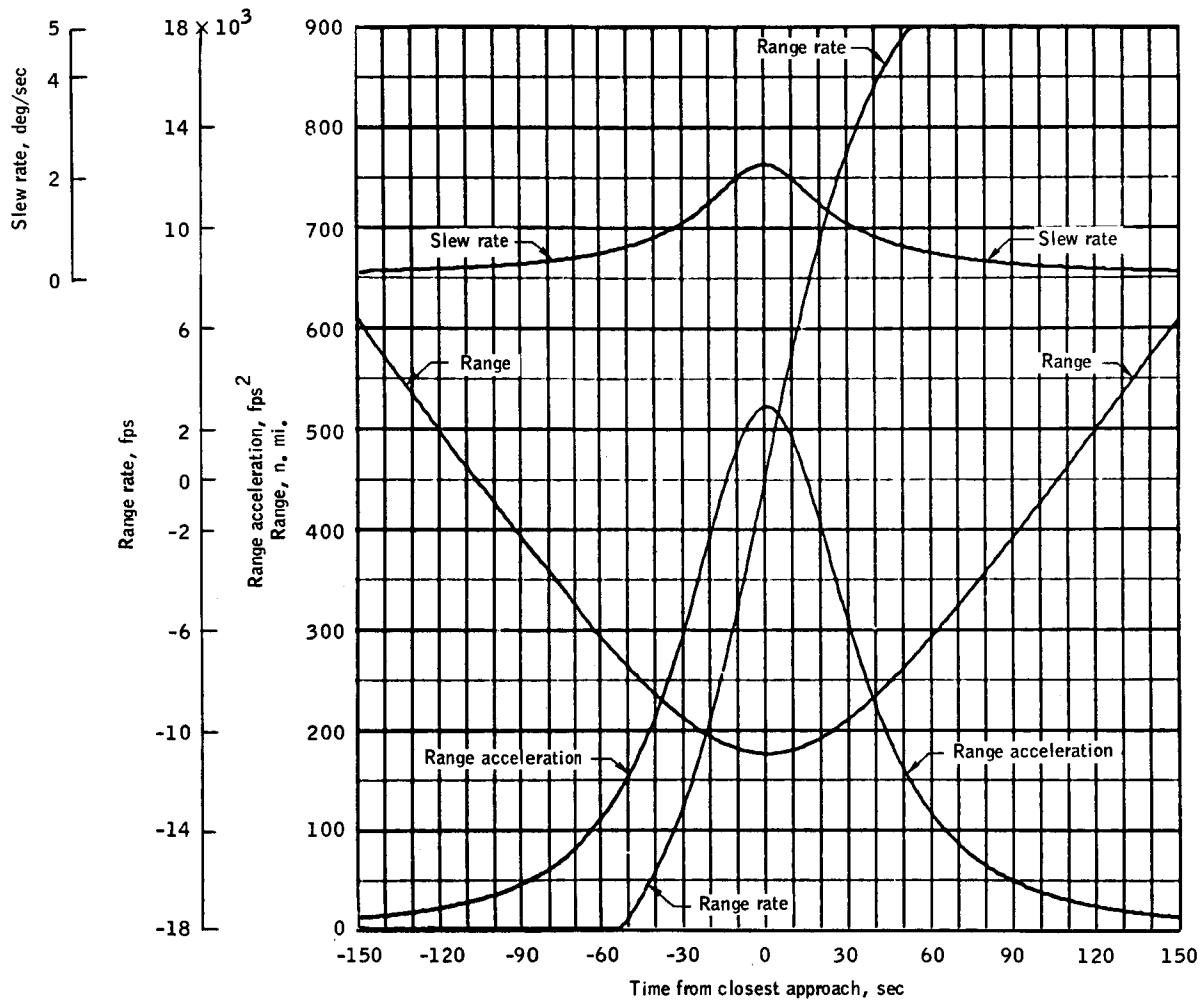
(hh) Revolution 92.

Figure 3 .- Continued.



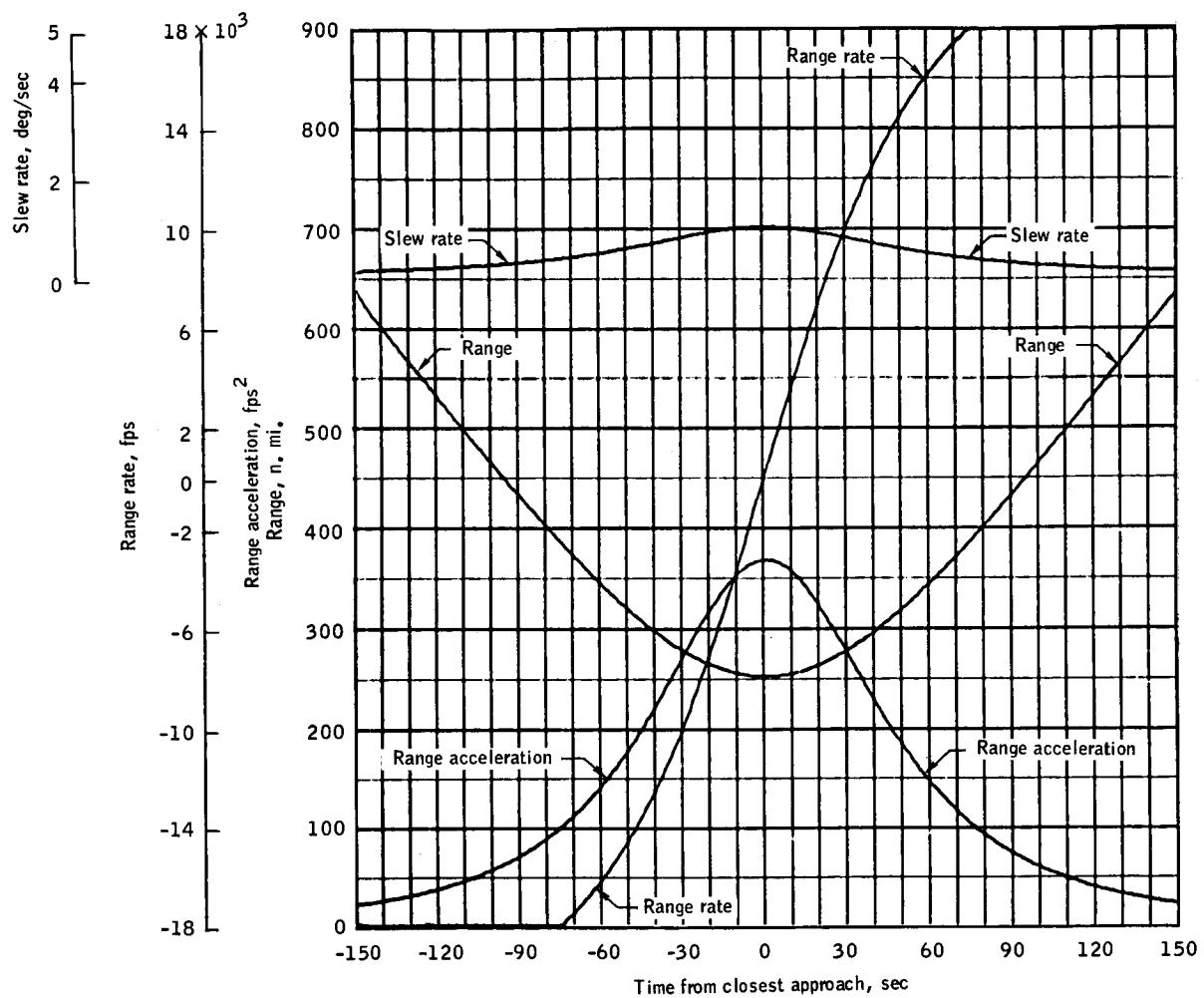
(ii) Revolution 103.

Figure 3.- Continued.



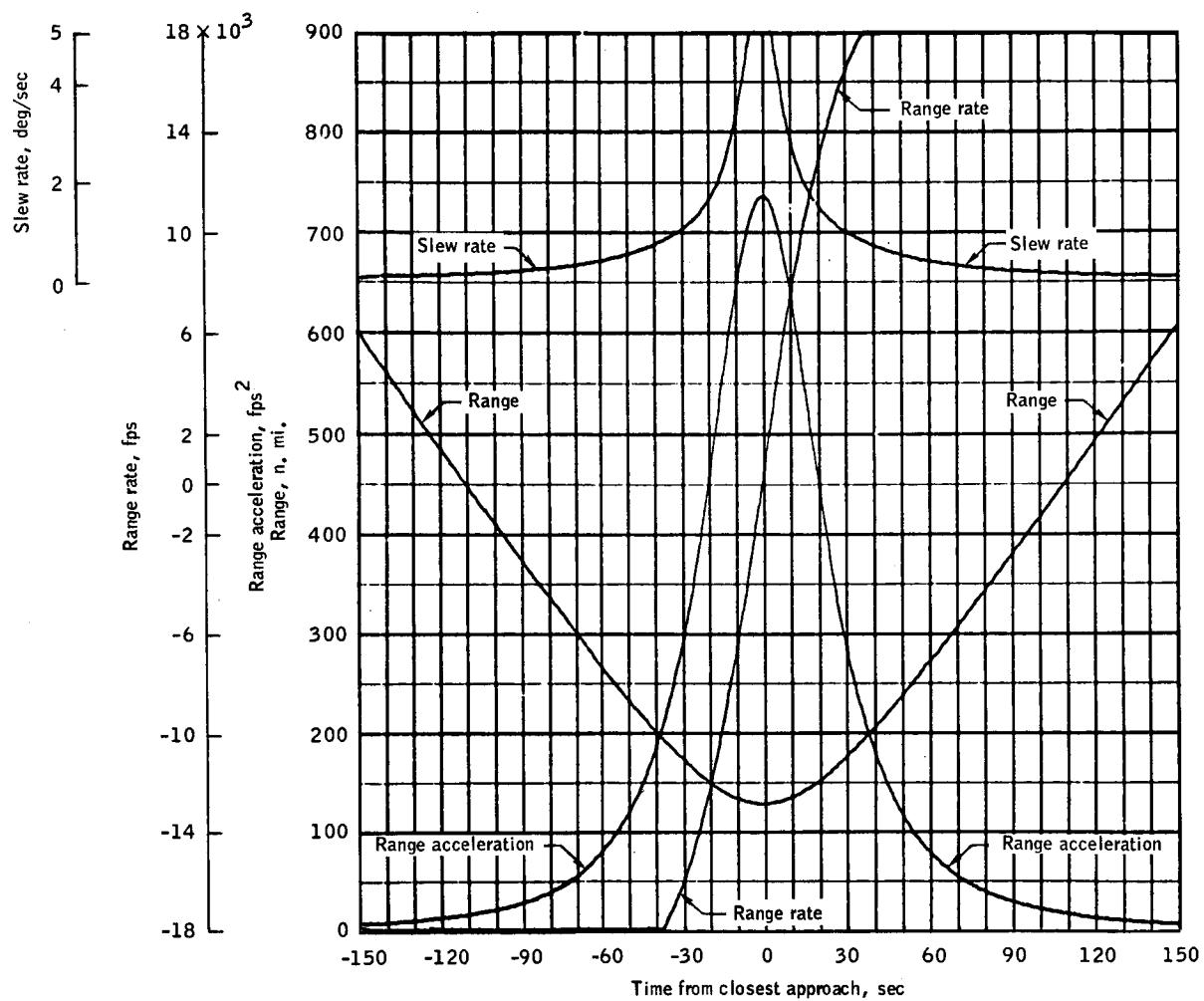
(jj) Revolution 104.

Figure 3.- Continued.



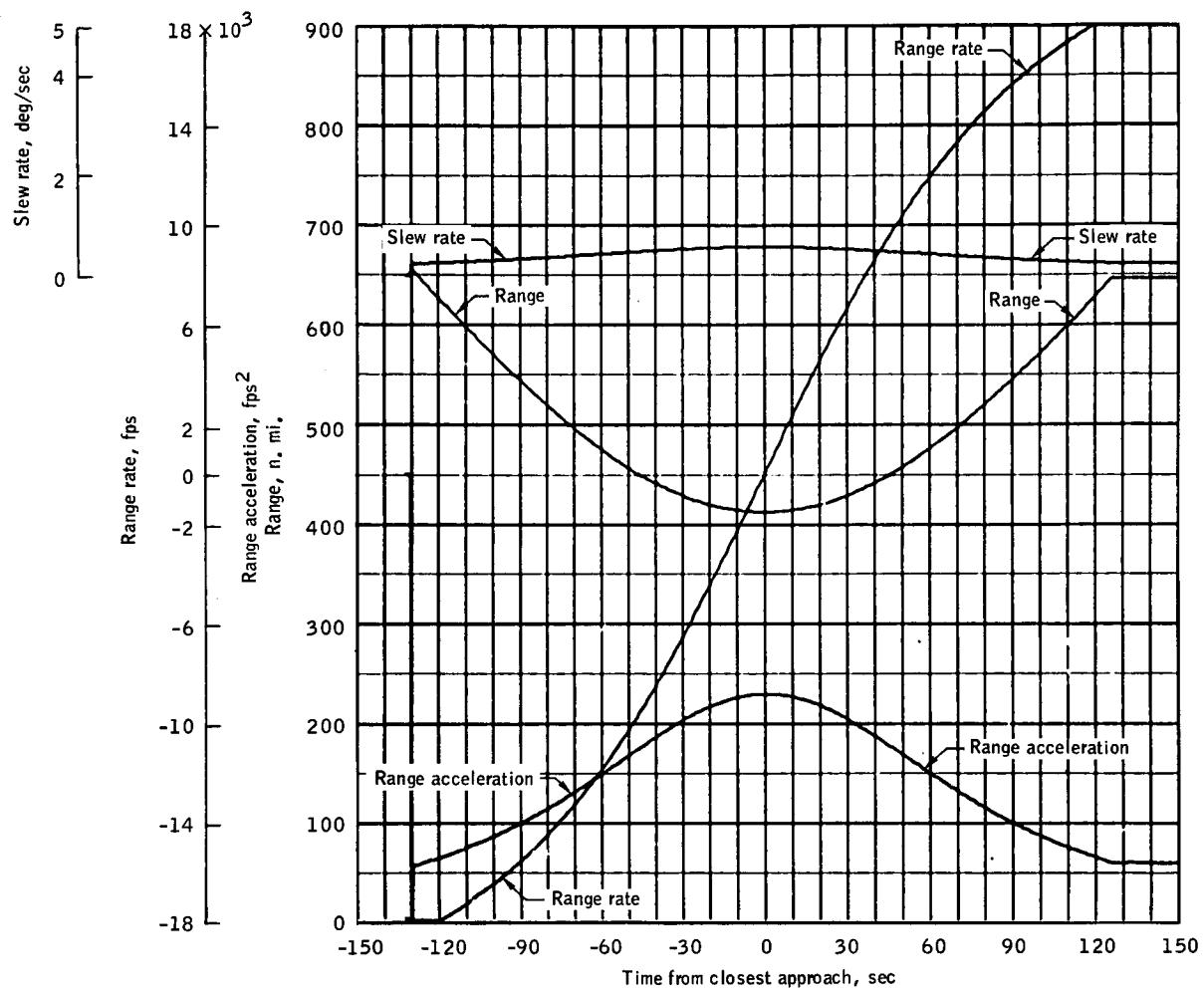
(kk) Revolution 105.

Figure 3.- Continued.



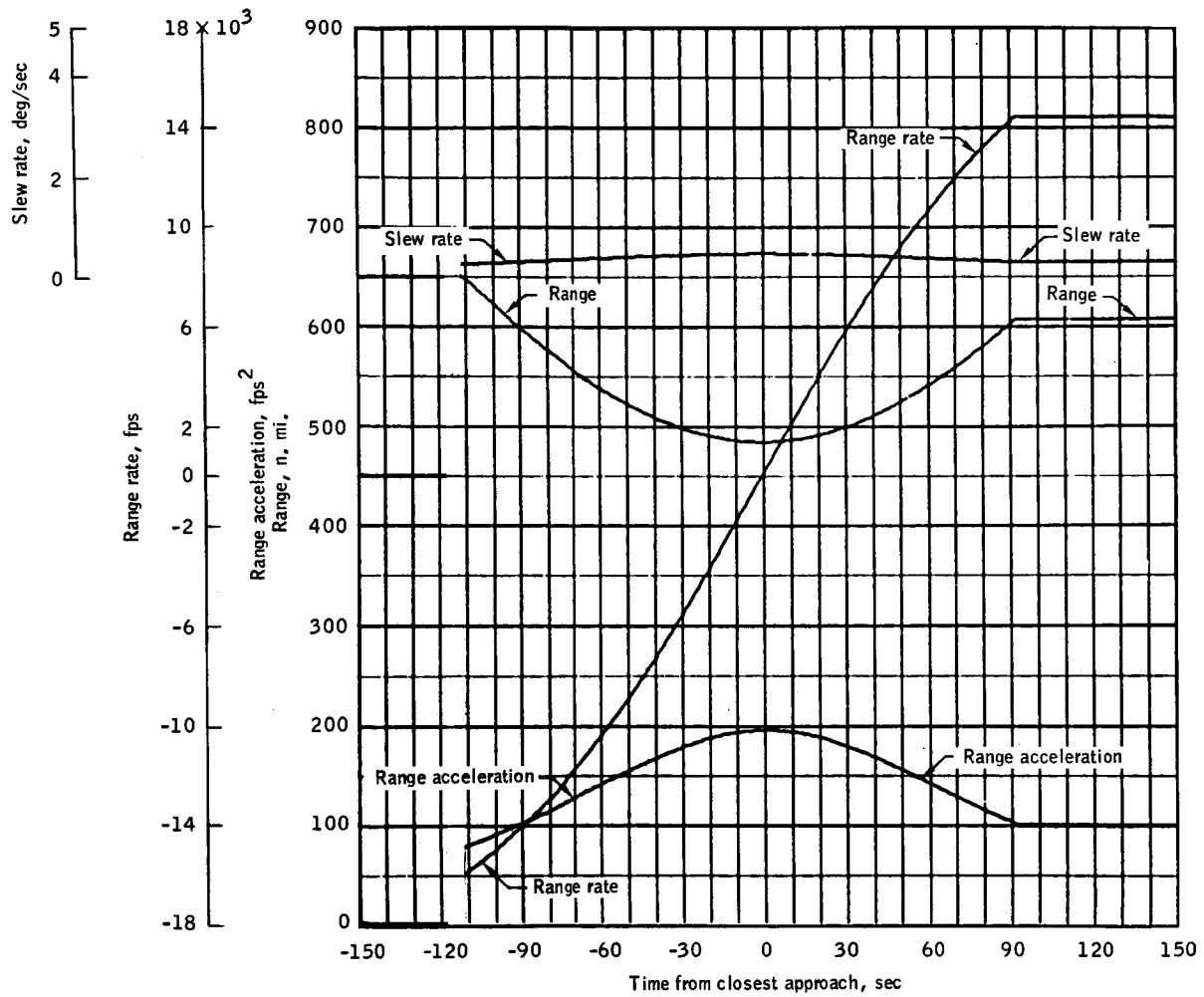
(II) Revolution 106.

Figure 3.- Continued.



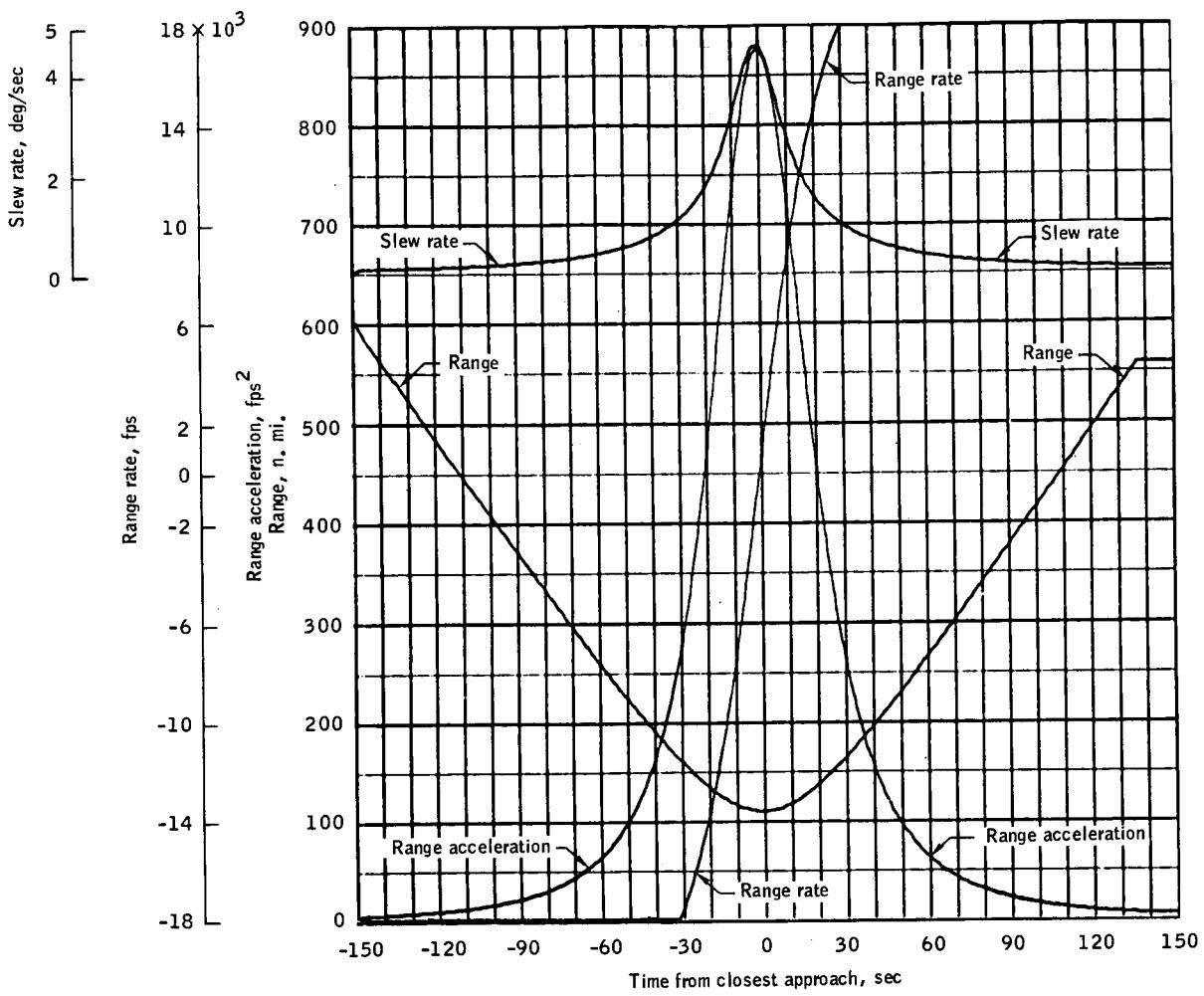
(mm) Revolution 107.

Figure 3.- Continued.



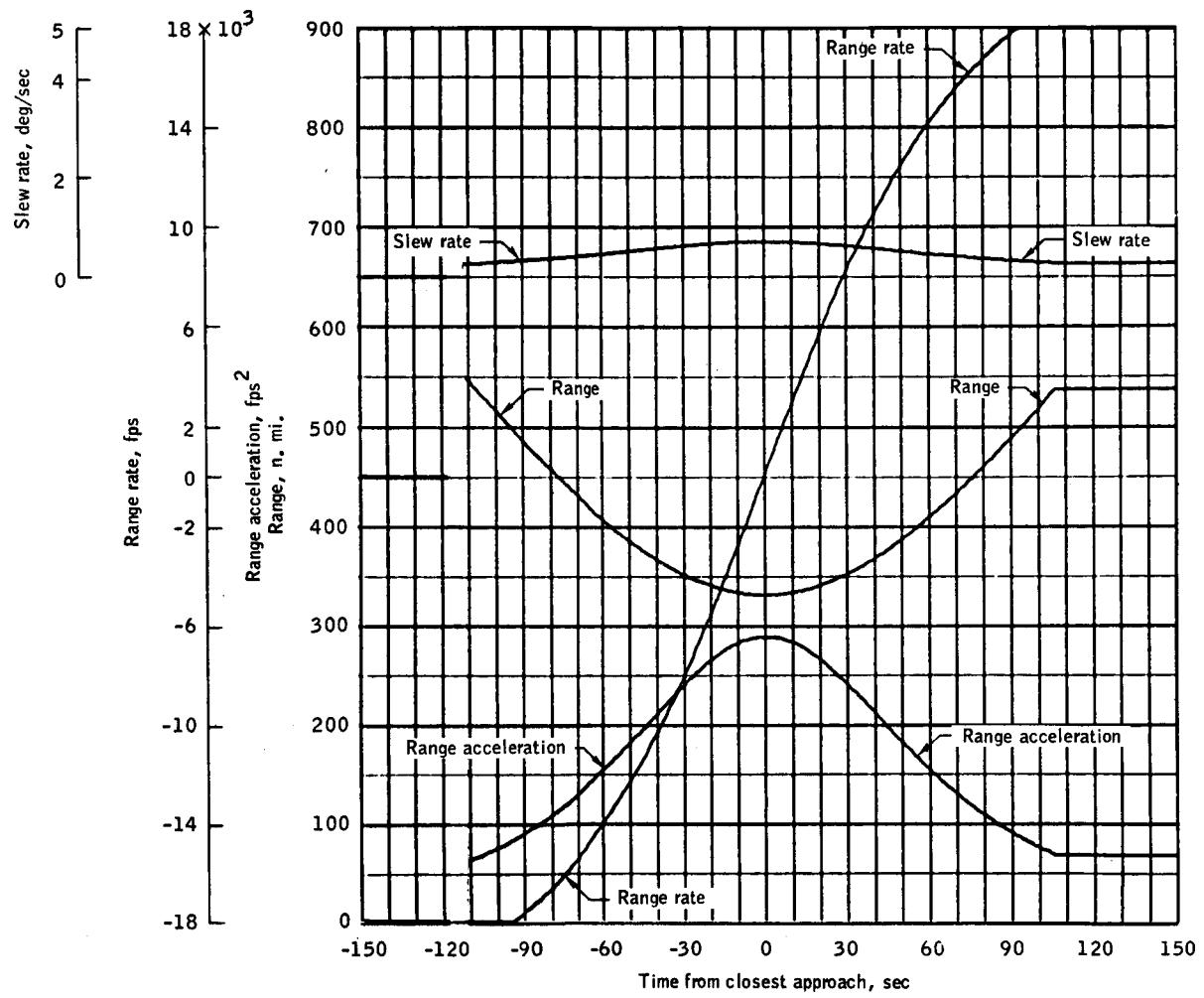
(nn) Revolution 117.

Figure 3.- Continued.



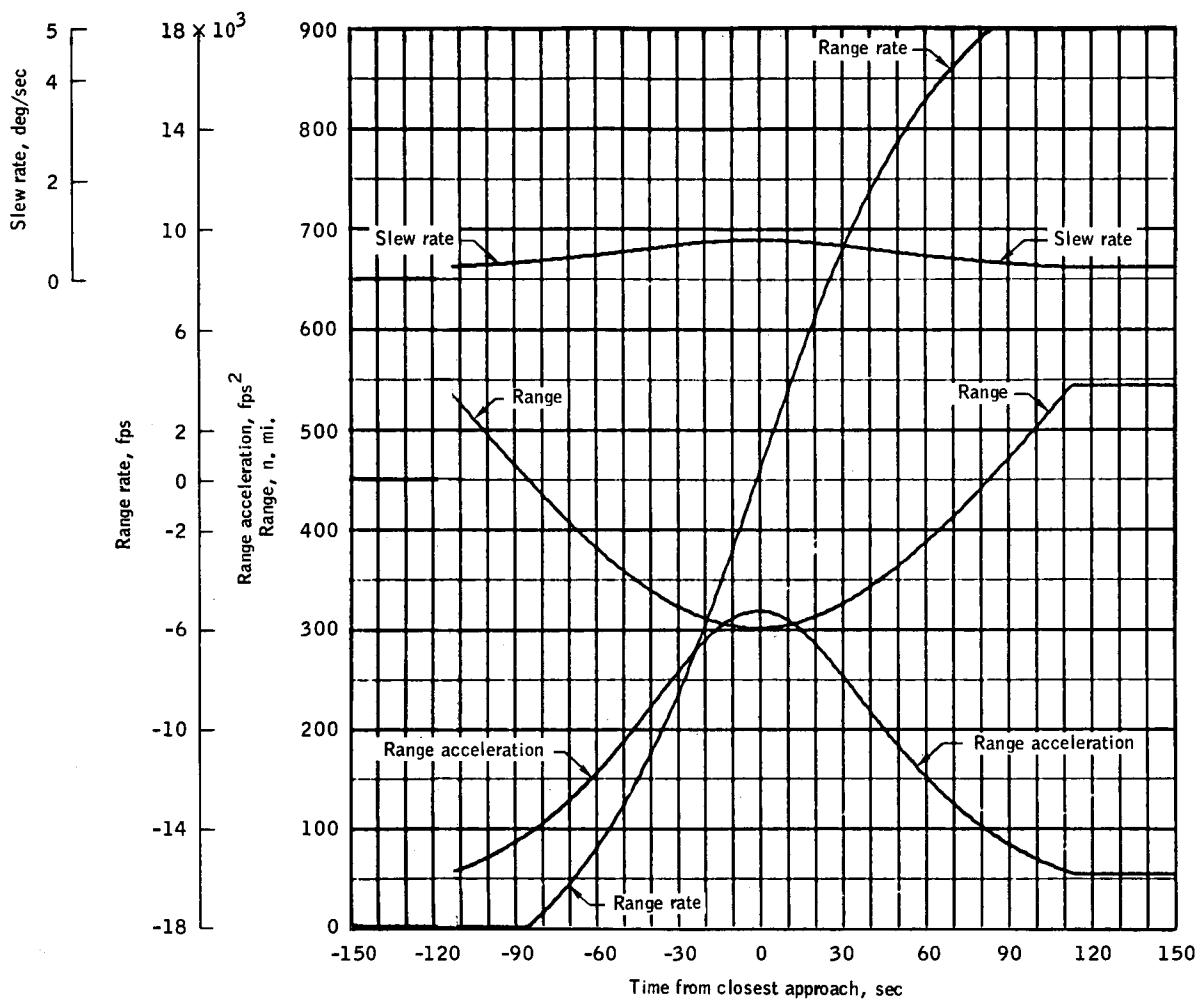
(oo) Revolution 118.

Figure 3.- Continued.



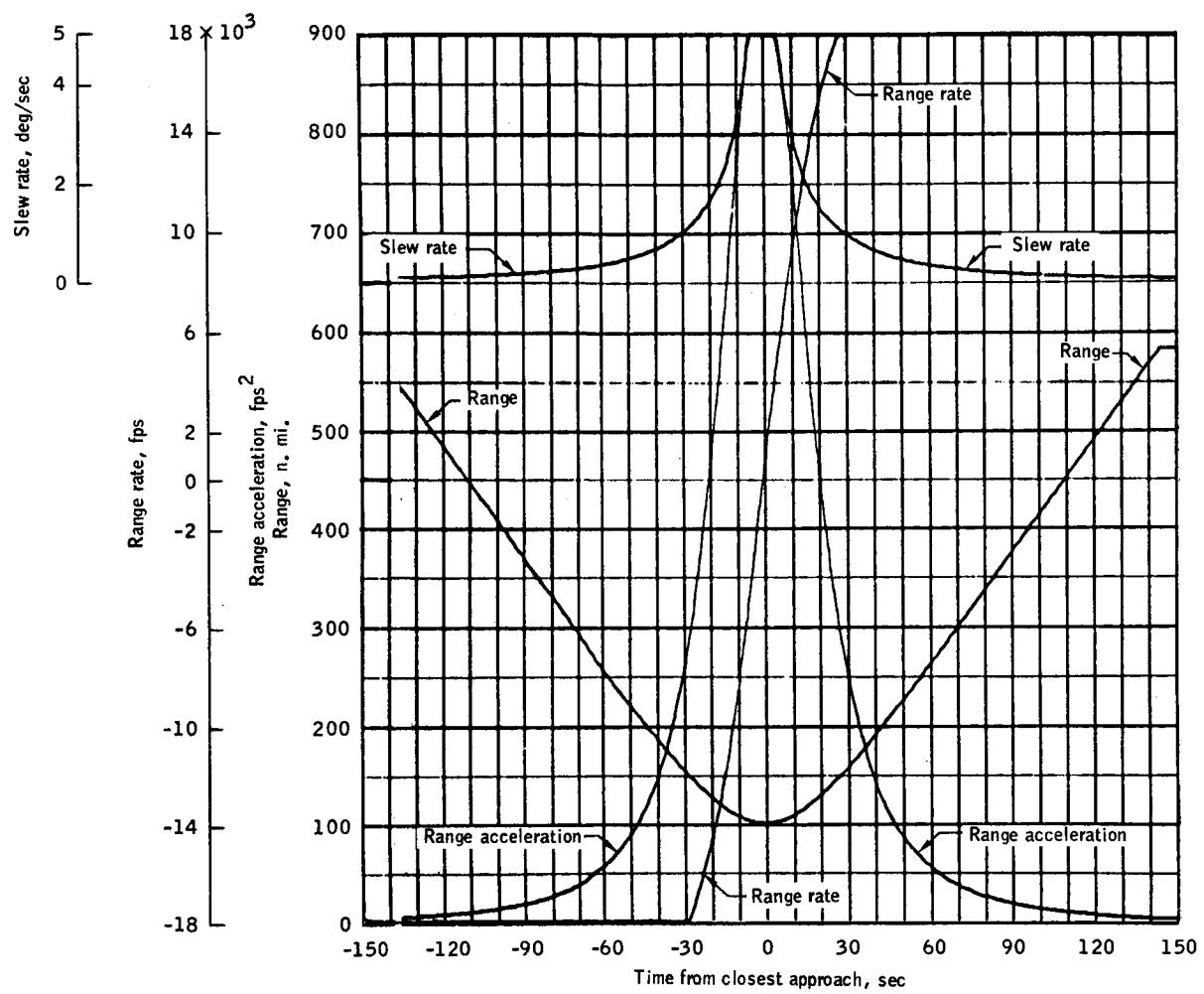
(pp) Revolution 119.

Figure 3.- Continued.



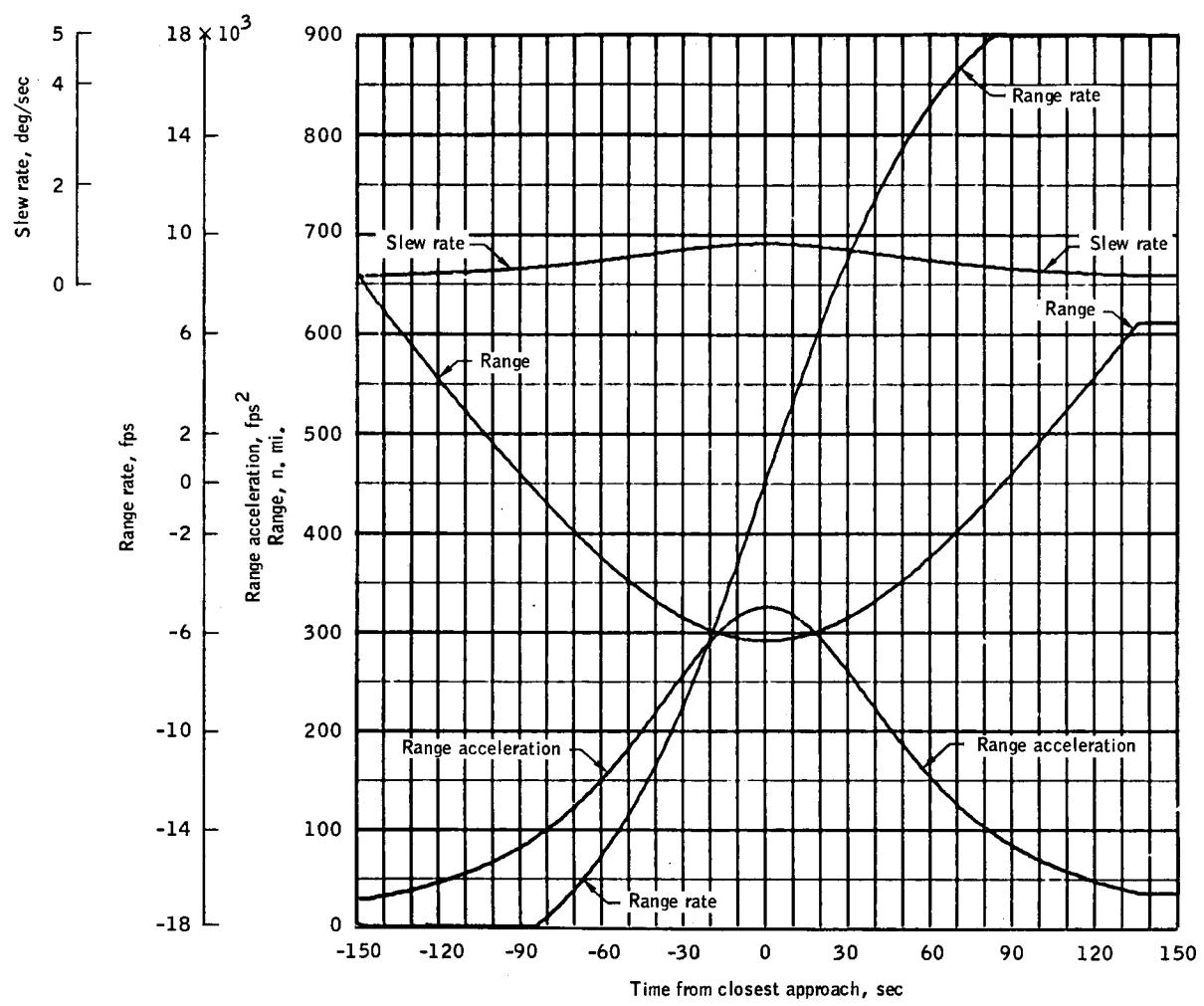
(qq) Revolution 120.

Figure 3. - Continued.



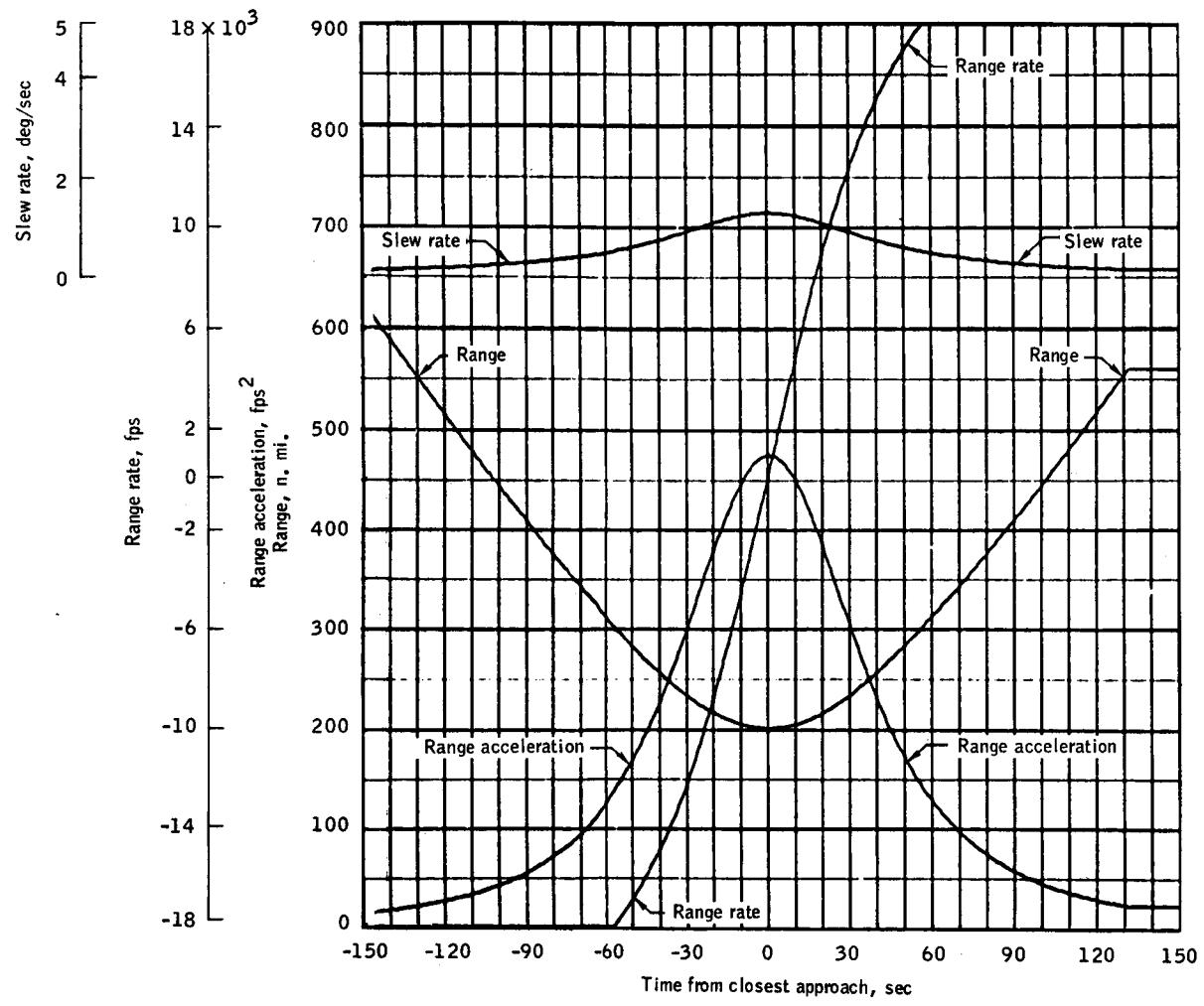
(rr) Revolution 121.

Figure 3.- Continued.



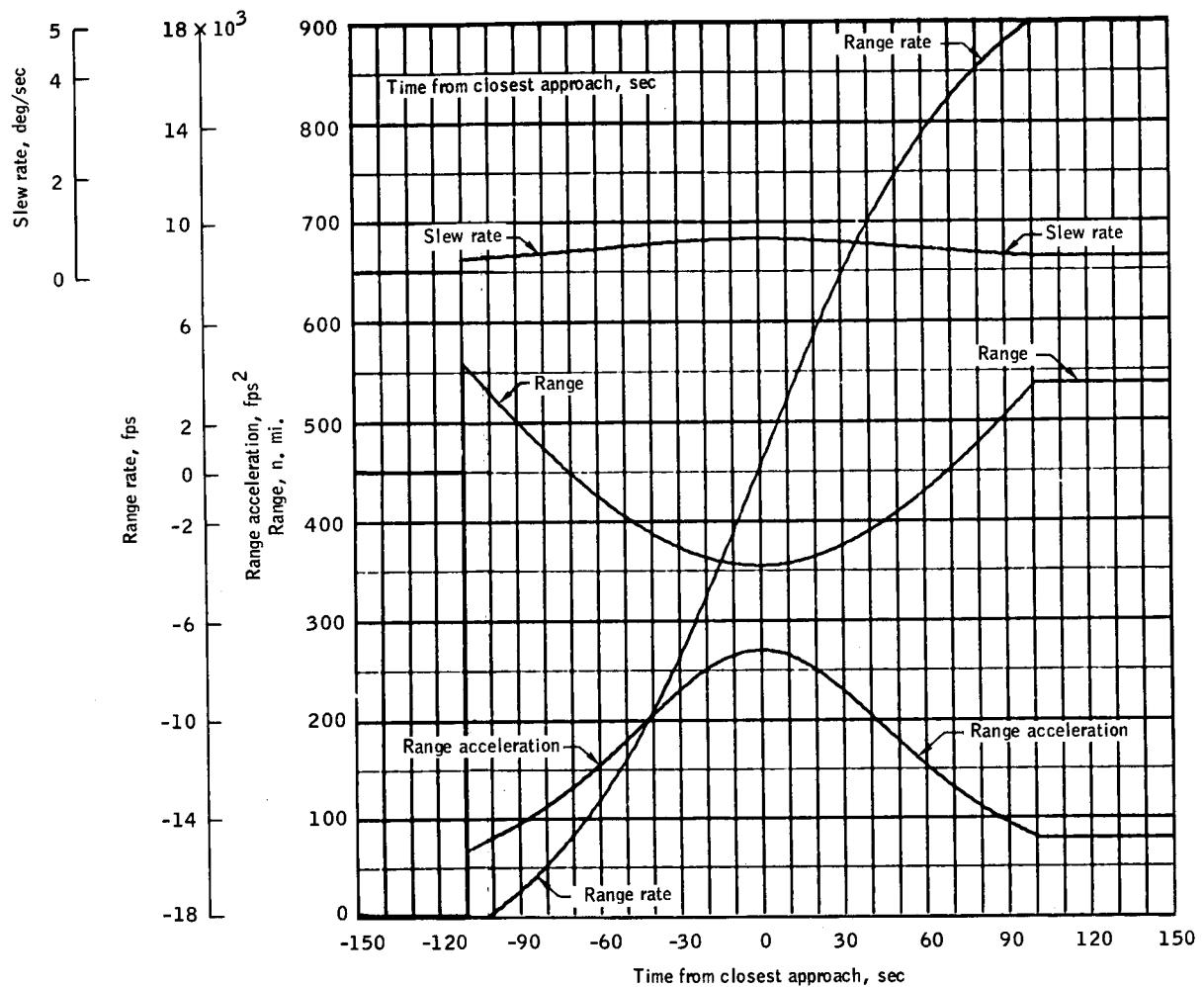
(ss) Revolution 132.

Figure 3.- Continued.



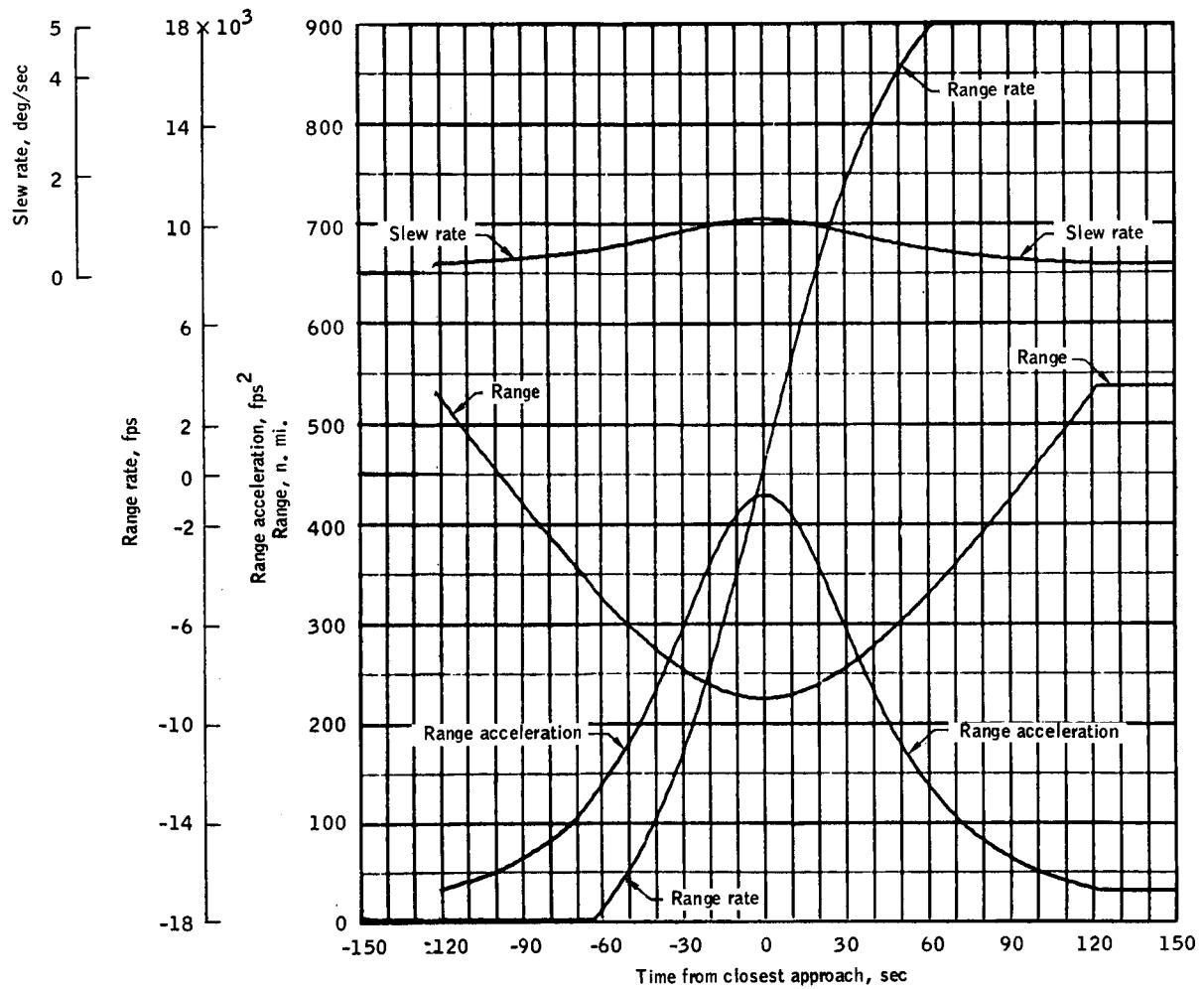
(tt) Revolution 133.

Figure 3.- Continued.



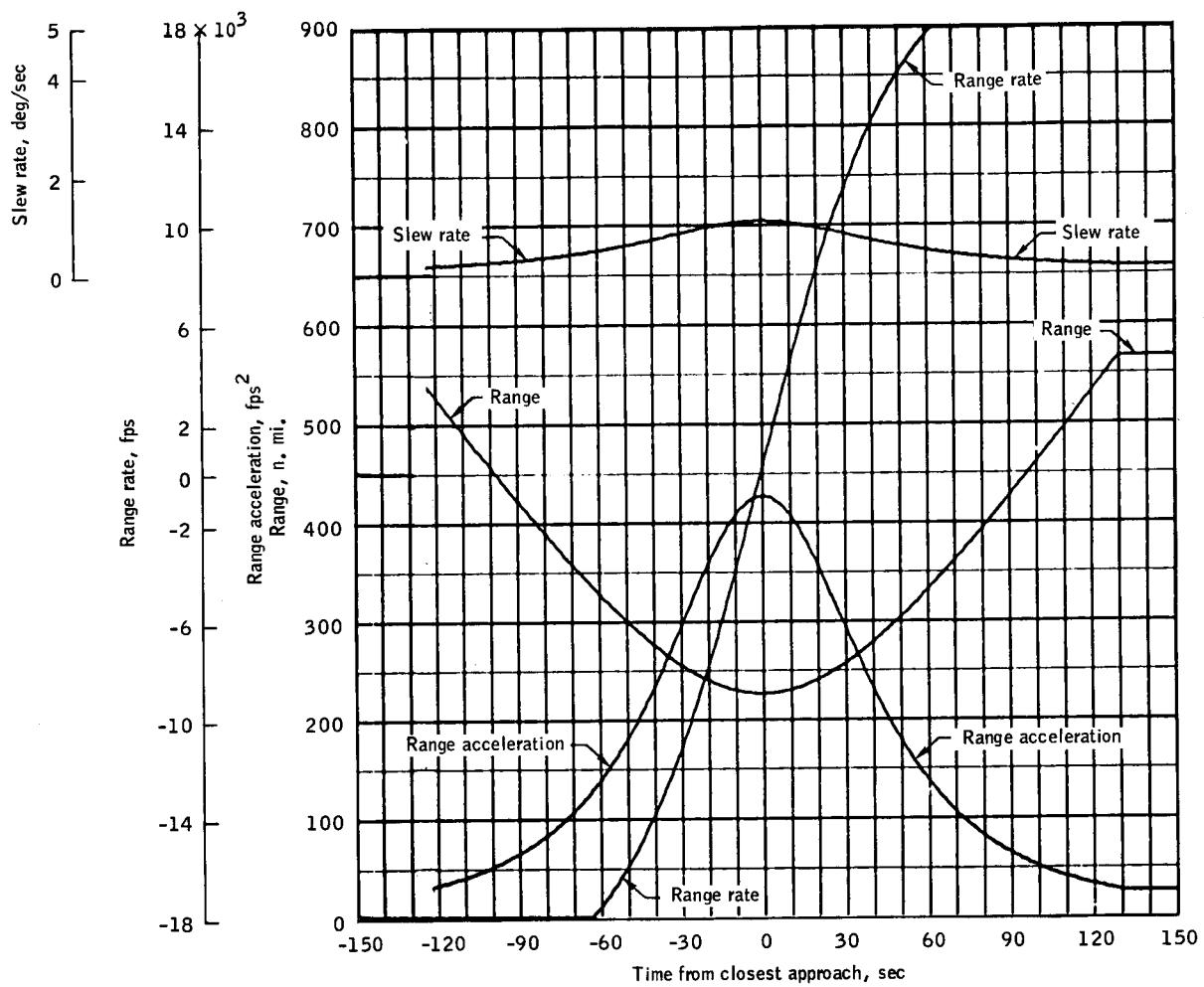
(uu) Revolution 134.

Figure 3.- Continued.



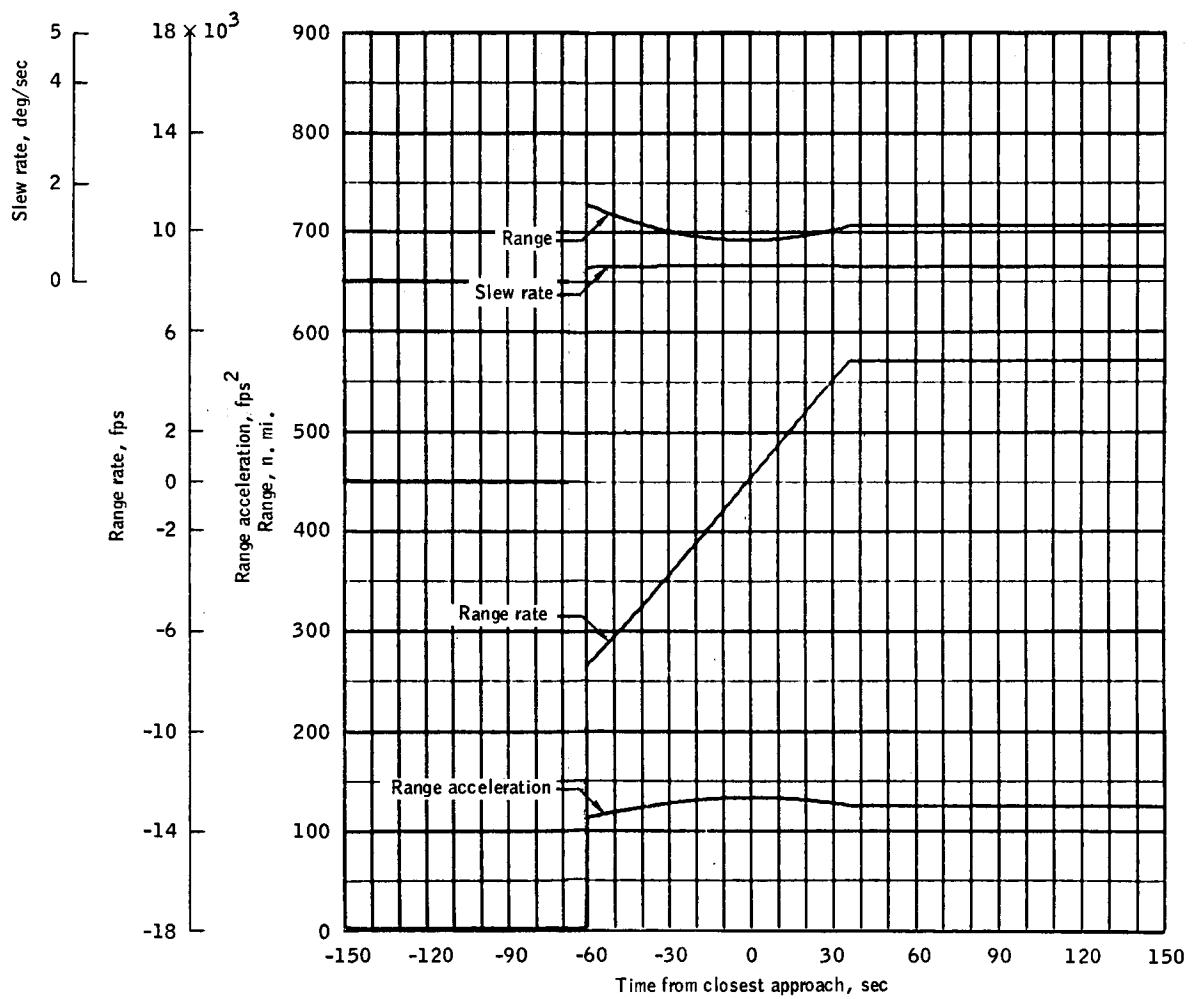
(vv) Revolution 135.

Figure 3.- Continued.



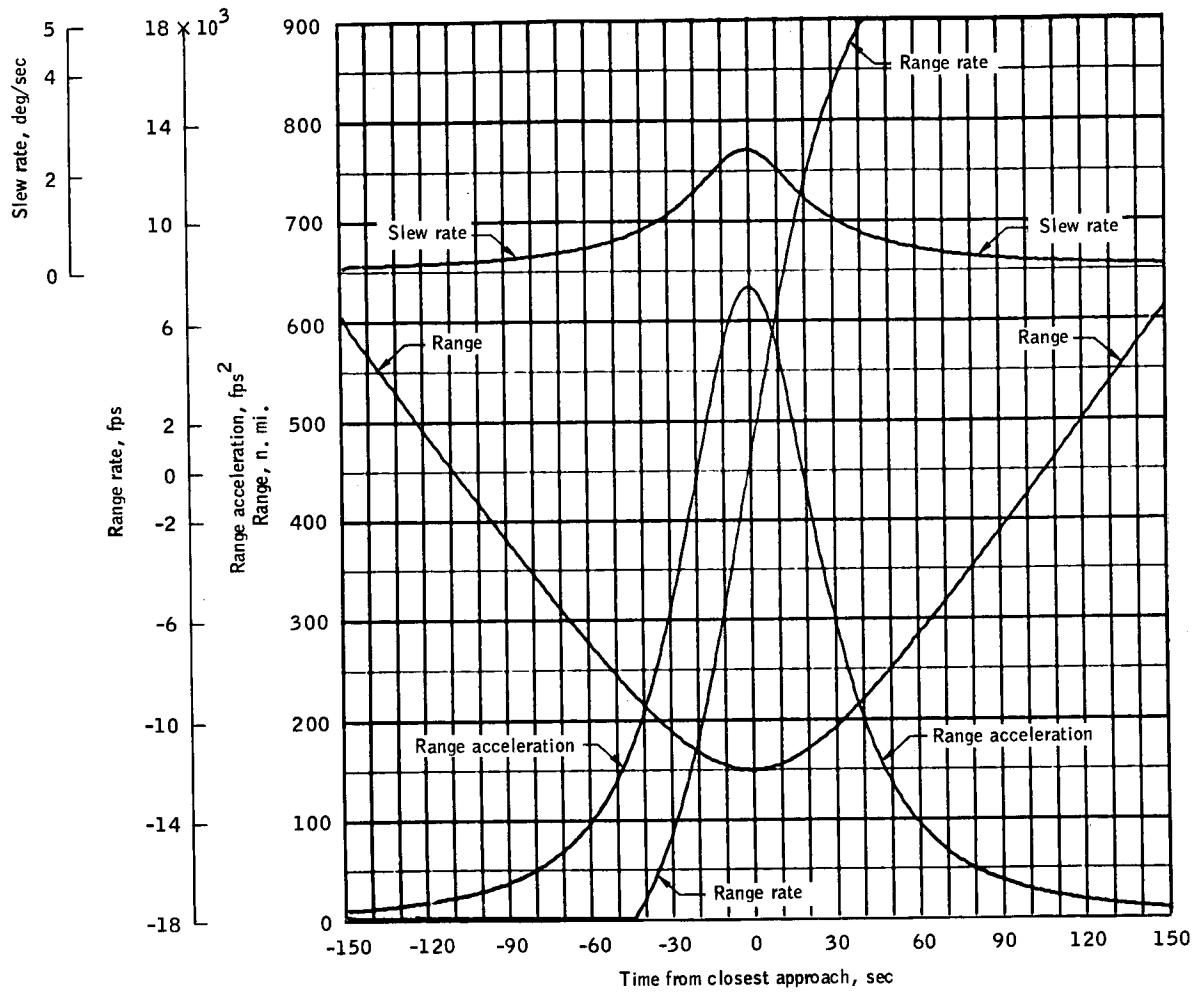
(ww) Revolution 136.

Figure 3.- Continued.



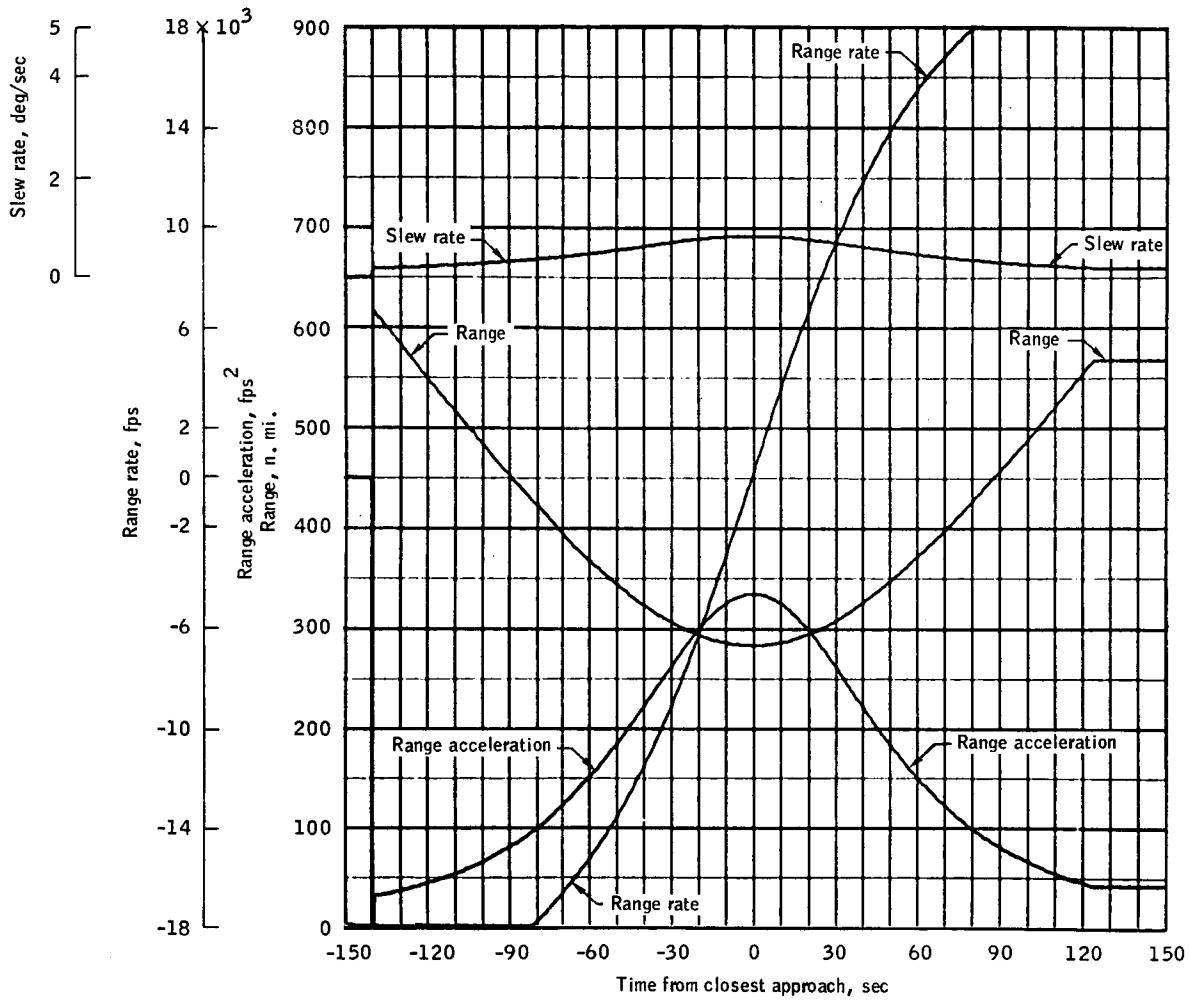
(xx) Revolution 146.

Figure 3.- Continued.



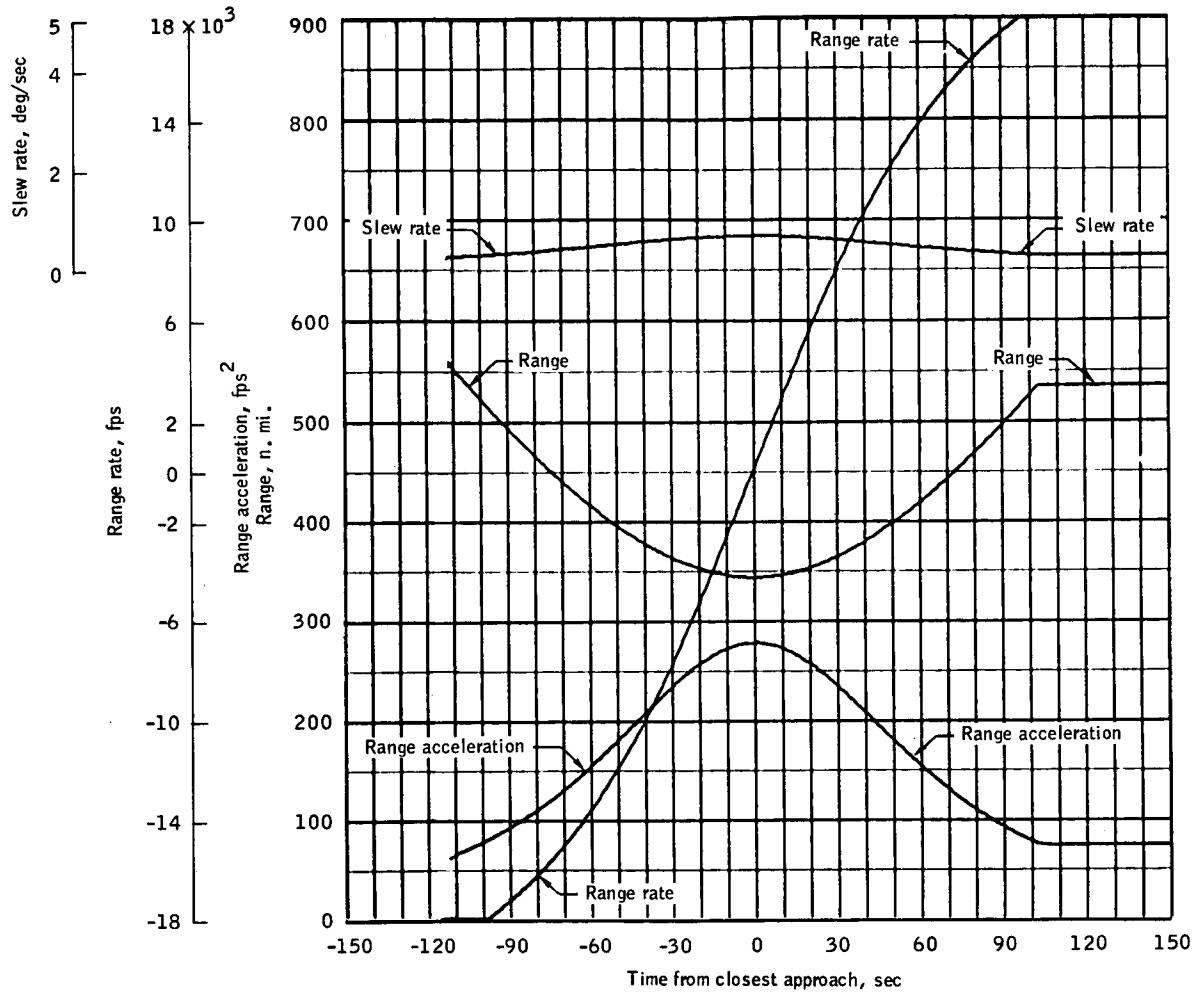
(yy) Revolution 147.

Figure 3.- Continued.



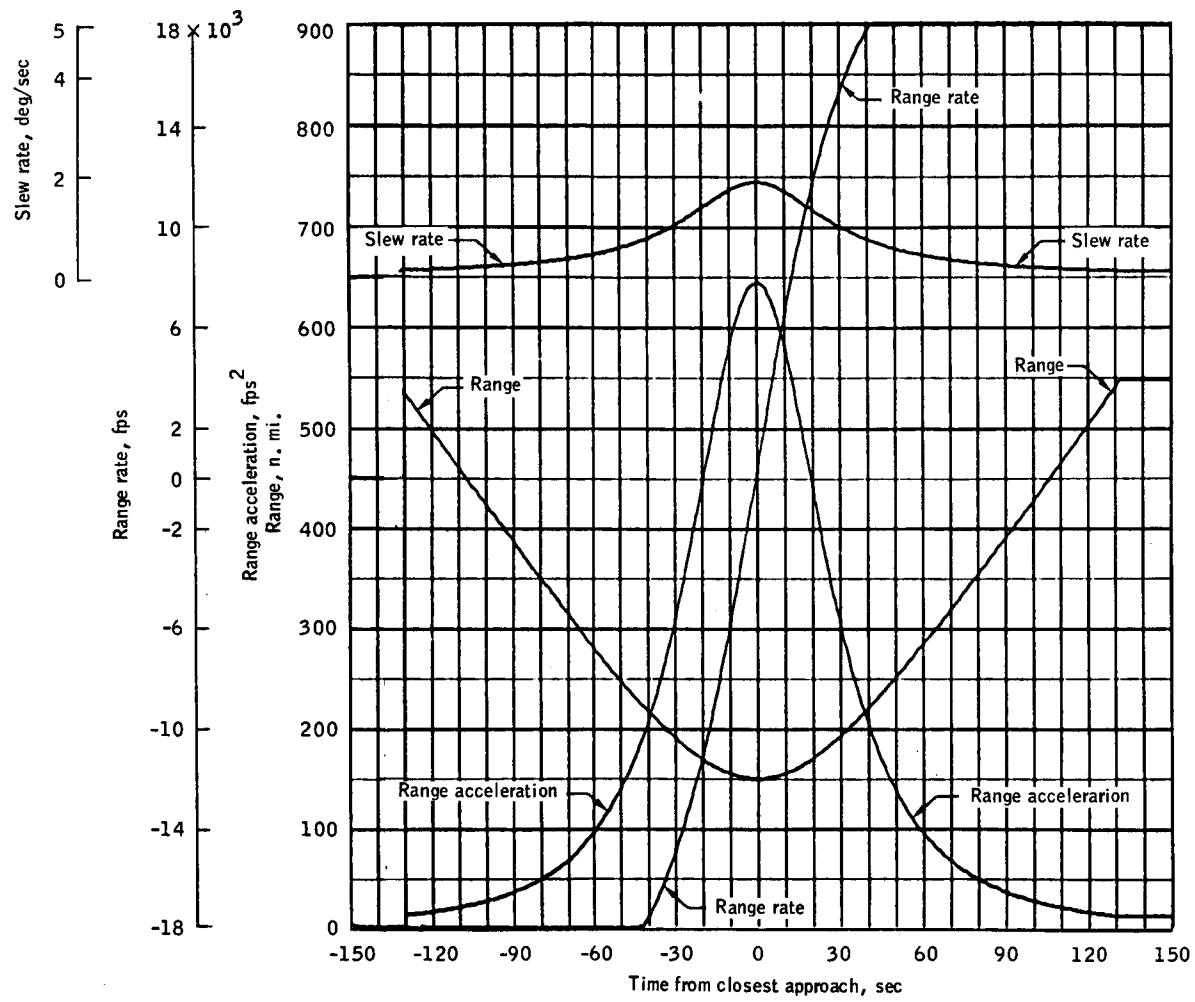
(zz) Revolution 148.

Figure 3.- Continued.



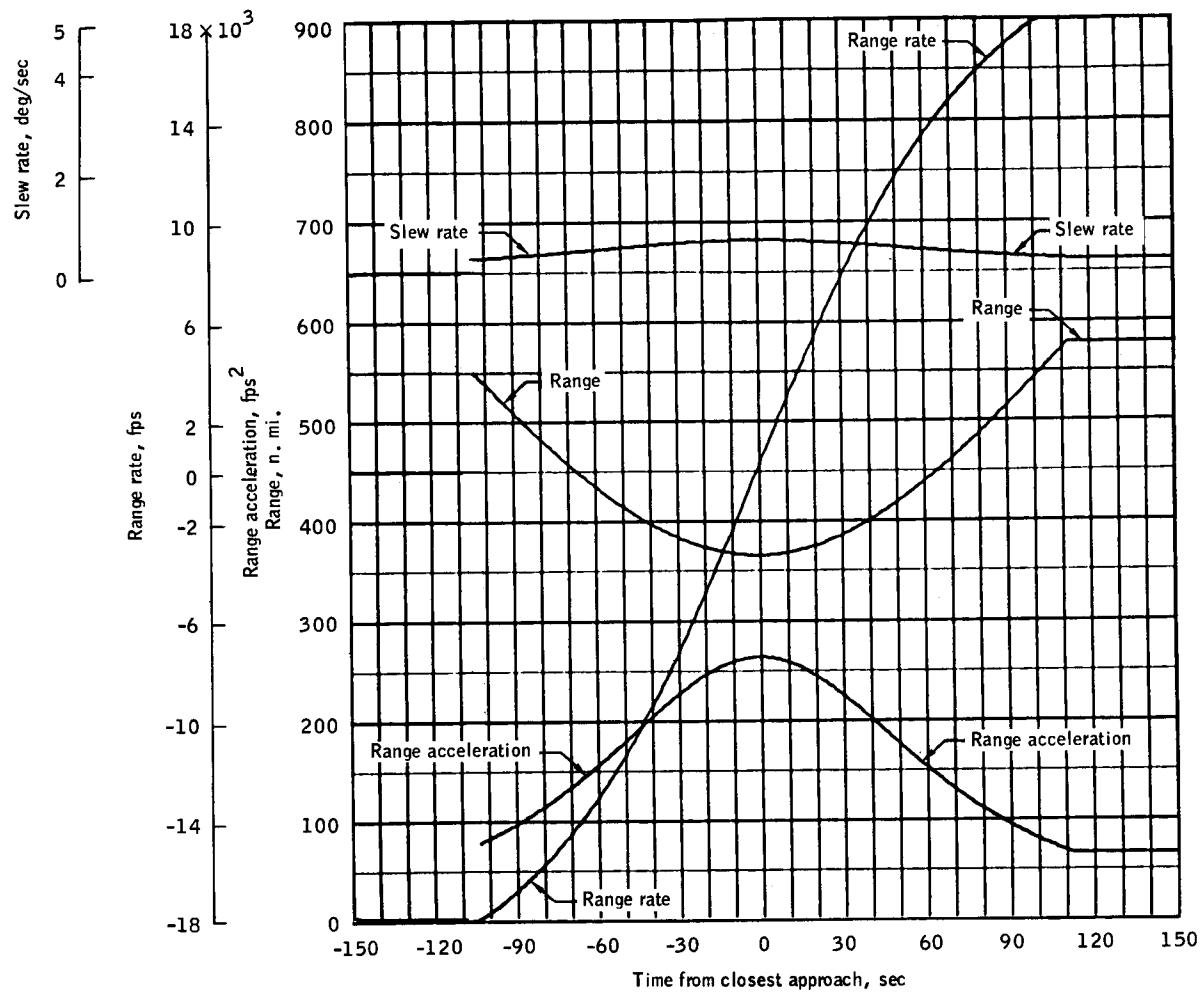
(aaa) Revolution 149.

Figure 3.- Continued.



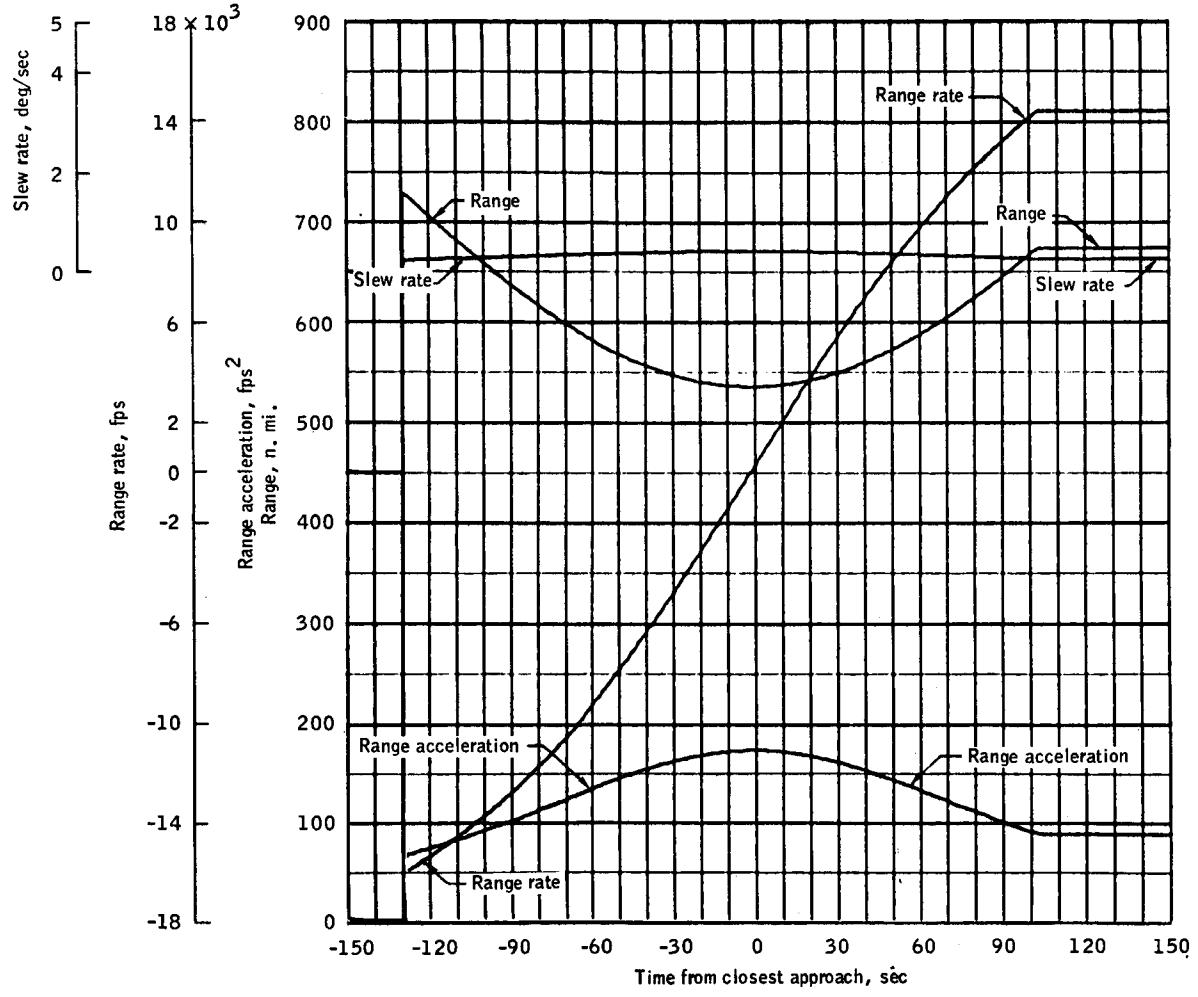
(bbb) Revolution 150.

Figure 3.- Continued.



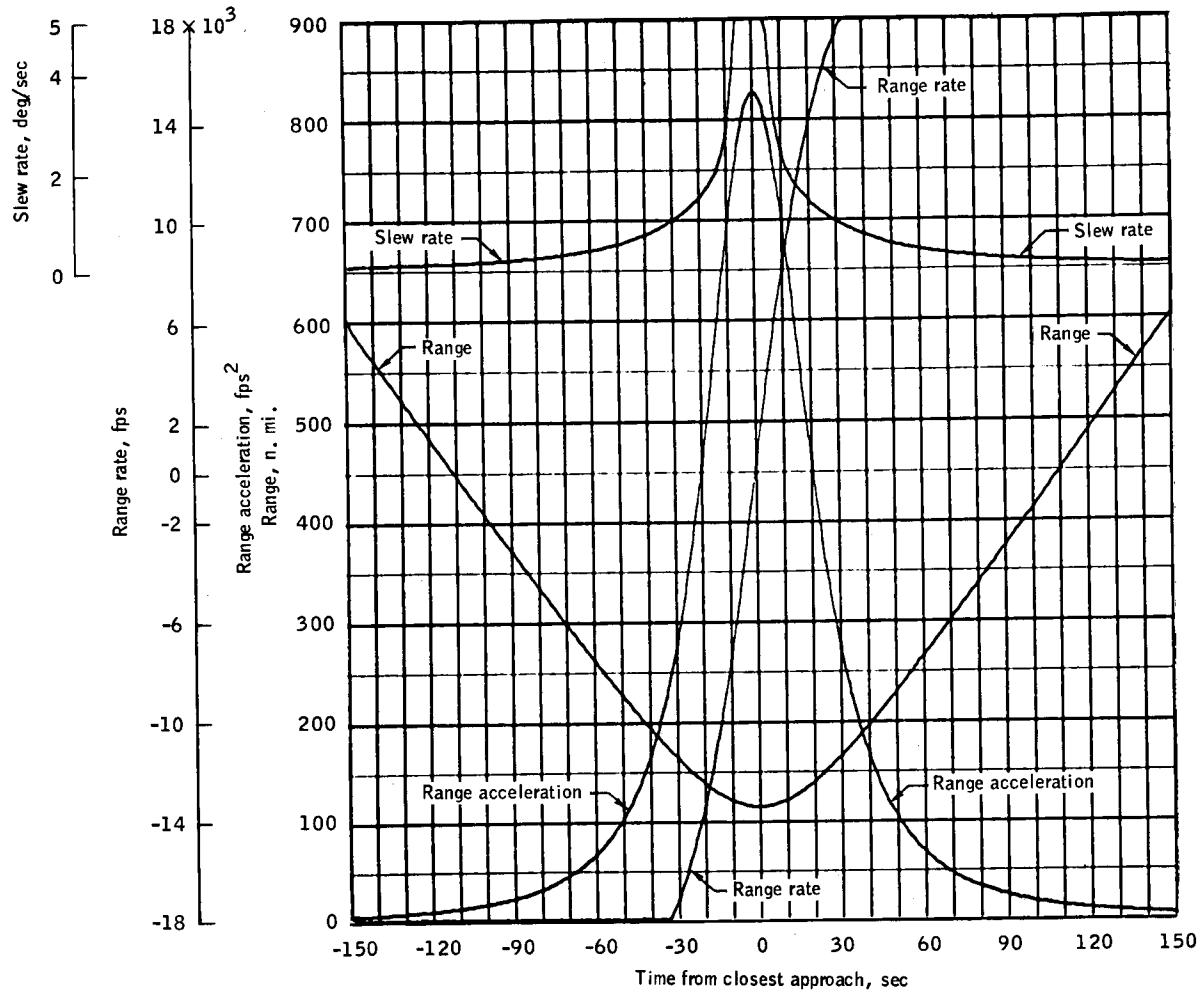
(ccc) Revolution 151.

Figure 3.- Continued.



(ddd) Revolution 161.

Figure 3. - Continued.



(eee) Revolution 162.

Figure 3.- Concluded.

REFERENCES

1. TRW Systems: Mission Requirements SA-205/CSM-101 "C" Type Mission. TRW SPD8-R-001, February 14, 1968.
2. Griffith, D. J.; Terry, J. W.; and Heath, D. W.: Apollo Mission C (AS-205/CSM-101) Spacecraft Reference Trajectory. MSC IN 68-FM-14, January 16, 1968.